

Engineering Design File

Exposure Rate Requirements using MicroShield v. 6.02

**Portage Project No.: 2073.00
Project Title: PM-2A Remediation Phase I**



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4. Title: Exposure Rate Requirements using MicroShield v. 6.02

5. Summary:

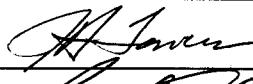
Exposure rates for the unshielded PM-2A Tanks V-13 and V-14 were determined based upon tank radionuclide sample data and the use of the computer code MicroShield v. 6.02 (MicroShield 2003). Lead shielding requirements for workers welding lifting plates on the tanks and removing sand from the tank cradles for the removal of the tanks from the ground, and concrete shielding requirements for the tanks after placement in the TAN-607A High Bay were determined using MicroShield v. 6.02.

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I. INTRODUCTION AND PURPOSE

The purpose of this engineering design file (EDF) is to estimate the exposure rates in mR/hr that personnel will be subjected to during excavation of the PM-2A Tanks V-13 and V-14 and placement of the tanks in the TAN-607A High Bay. This EDF also evaluates the lead shielding requirements for workers welding lifting brackets on the tanks and removing sand from the tank cradles, and concrete shielding requirements for the tanks after placement in the TAN-607A High Bay. All exposure and shielding calculations were performed using MicroShield v. 6.02 (MicroShield 2003) (see Attachment 1 for output files).

2. EXPOSURE RATE CALCULATIONS

Exposure calculations were performed for the PM-2A tanks at the Idaho National Engineering and Environmental Laboratory using MicroShield v. 6.02. Exposure calculations were performed for five receptor locations at contact (i.e., 1/2 in. from surface) and at 3 ft from the tank surfaces.

2.1 Radionuclide Inventory

The inventory of dominating gamma emitters ^{137}Cs , ^{60}Co , and ^{90}Sr were derived from sludge sample data as shown in Table 1.

Table 1. Sludge sample results for the PM-2A tanks.

Tank	Nuclide	Sample Concentration (pCi/g)				95% UCL (pCi/g)
		WGS10501	WGS10601	WGS10602	WGS10701	
V-13	^{60}Co	4.66E3	6.65E2	4.25E2	5.45E2	4.00E3
	^{137}Cs	7.75E5	8.11E5	8.31E5	7.02E5	8.47E5
	^{90}Sr	1.04E6	2.05E5	1.01E5	1.53E5	8.99E5
		WGS10801	WGS10901	WGS10902	WGS11011	
V-14	^{60}Co	6.85E1	3.87E3	5.51E2	6.16E3	6.05E30
	^{137}Cs	7.09E5	9.89E5	8.36E5	1.39E6	1.33E6
	^{90}Sr	5.43E3	6.53E5	1.54E5	1.16E6	1.11E6

The 95% upper confidence limit (UCL) concentrations were used to derive the waste activities. The 95% UCLs were calculated using the Student's *t*-test for a normal distribution.

The volume of sludge in each tank was determined using geometrical relationships. The sludge was assumed to be 12 in. in height in the center of Tank V-13 and 4 in. in height in the center of Tank V-14. This results in a sludge surface in Tank V-13 that is 81.38 in. in width with a volume of 7,078 L. Tank V-13 had a sludge surface width of 68.82 in. and a volume of 1,400 L. Assuming a density of the sludge of 1.35 g/cc, the total mass of the sludge in Tanks V-13 and

V-14 was estimated to be 9,555.3 kg and 1,890.6 kg, respectively. The resulting sludge activities are provided in Table 2.

Table 2. Calculated sludge activities for the PM-2A tanks.

Tank	Nuclide	95% UCL (pCi/kg)	Total kg	Ci
V-13	^{60}Co	4.00E6	9,555.3	3.82E-2
	^{137}Cs	8.47E8	9,555.3	8.09
	^{90}Sr	8.99E8	9,555.3	8.59
V-14	^{60}Co	6.05E6	1,890.6	1.14E-2
	^{137}Cs	1.33E9	1,890.6	2.51
	^{90}Sr	1.11E9	1,890.6	2.10

2.2 Model Geometry and Receptors

MicroShield provides several geometries for exposure and shielding calculations. However, the choice of geometries did not provide for the exact geometries of the tanks. Therefore, simplified geometric systems were developed to mimic the tank geometries. Rectangular solids geometries were used to represent the tank environment in the exposure calculations. Figure 1 provides the established representations of the PM-2A tanks. Figure 2 provides representations of the receptor locations and the geometries chosen for each receptor location.

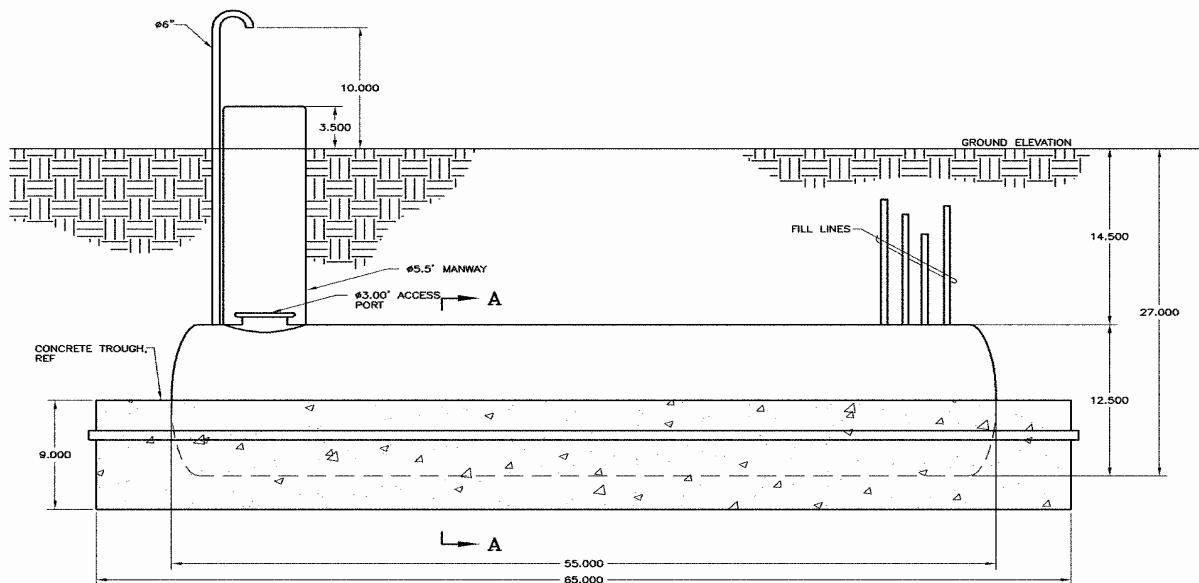
Exposure calculations were performed for five receptor locations at contact (i.e., 1/2 in. from surface) and at 3 ft from the tank surfaces. The receptors were placed in the middle of the length of each tank to maximize the exposures. The receptor at the end of the tank was placed horizontal with the waste to maximize the exposure at this location.

The geometry of the sludge in the tanks was investigated in the previous sections. However, MicroShield cannot represent sources that are not rectangular. Therefore, the sludge was modeled as 12 in. thick in Tank V-13 and 4 in. thick in Tank V-14. The width of the sludge at the surface was then adjusted from 81.38 to 55.17 in. in Tank V-13, and from 48.33 to 32.38 in. in Tank V-14. These geometries allowed the sludge volumes to remain constant, while assuming a constant sludge thickness in the model.

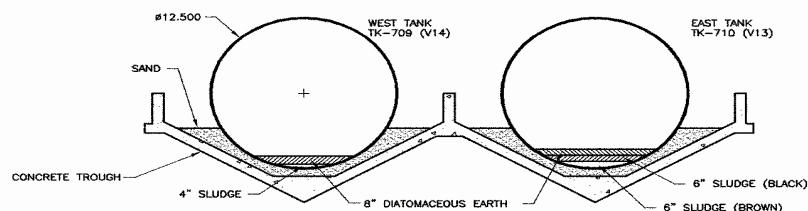
2.3 Shield Representations

MicroShield requires that the source and shield materials be specified. Existing material specifications in MicroShield were used to represent the source and shield materials. Concrete material was used to represent the sludge with a lowered density of 1.2 g/cc. Water material was used to represent the diatomaceous earth with a lowered density of 0.8 g/cc. Iron was used to represent the carbon steel tank at a density of 7.86 g/cc. In addition, several receptor

locations were evaluated for exposures with the addition of 1/2 in. of lead with a density of 11.34 g/cc.



a. Elevation: Looking West at Tank 710



Note: The sludge layers were measured before the diatomaceous earth was deposited.

b. Section A-A: Looking North

Figure 1. Conceptual representation of the PM-2A tanks.

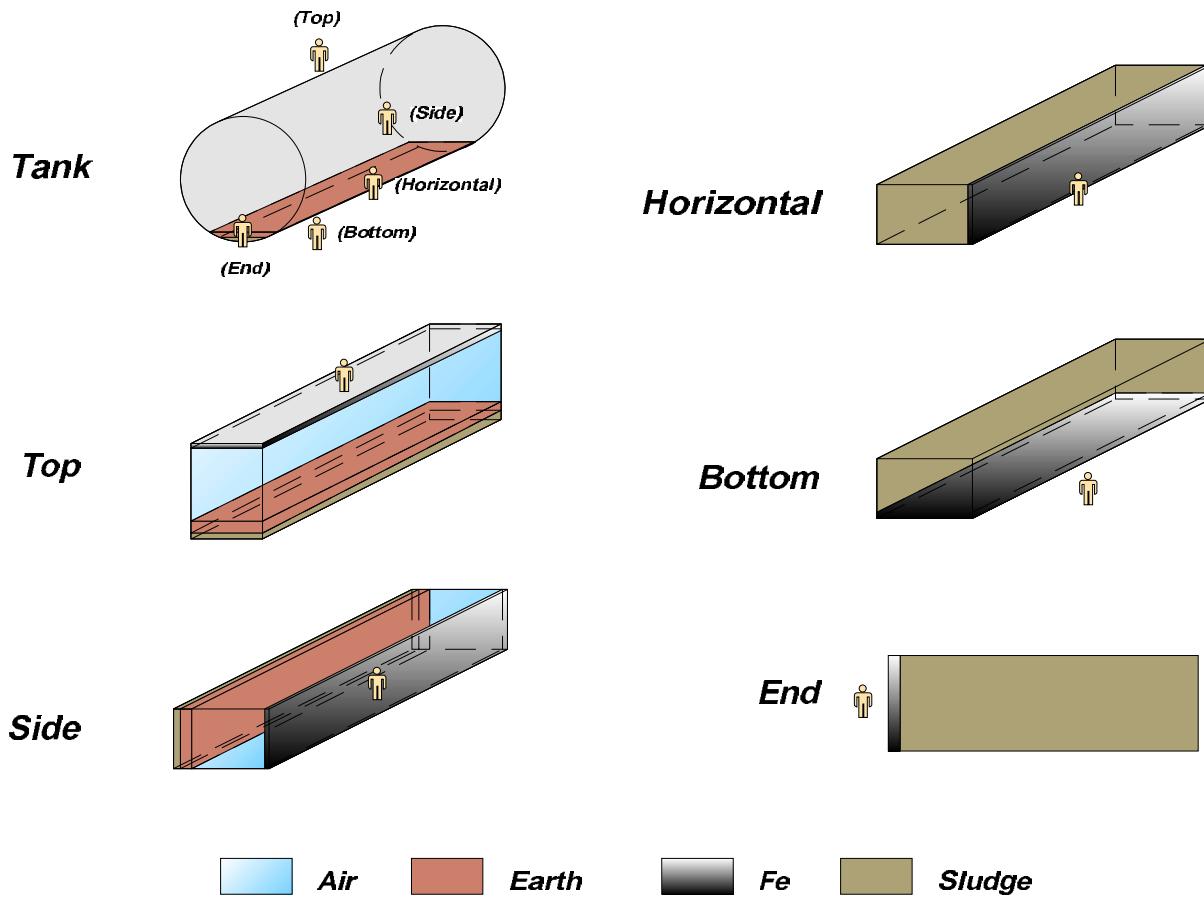


Figure 2. Geometric representations of the tanks and receptor locations.

2.4 Sensitivity Considerations

MicroShield uses a Gauss quadrature for point-kernal integration to estimate the photon fluence rate at a receptor point. With this method, the source is divided into a number of increments (i.e., mesh) as specified by the quadrature order. The quadrature, in parallel directions of the source, was investigated to determine the appropriate value of 100. With regard to "close" distances between the source and the exposure point, the point kernel model in MicroShield should be considered very approximate. The contact exposure numbers presented in this report are for 1/2 in. from the surface. This was necessary due to the solution algorithm, which is unstable on contact.

The buildup modeling in MicroShield uses several approximations and scattering effects are the greatest source of uncertainty in the exposure rate calculations. Generally, a comparison with and without buildup is investigated to determine if buildup is a significant contributor to the total. The PM-2A tank exposure calculations showed a high contribution from buildup. Therefore, several runs were performed using differing buildup materials.

2.5 Exposure Rate Results

The results of the modeling runs are provided in Tables 3 and 4. The bolded numbers are the exposure results that should be used for worker safety calculations. In general, air buildup material provided the highest exposure rates. However, air is only a significant material in terms of distance for the 3-ft receptor locations. Therefore, air buildup exposure results were chosen for most of the 3-ft receptor locations, unless another material provided a higher exposure rate.

The contact (i.e., 1/2 in.) receptor locations with air as a significant material in terms of total length in the system are for the top receptor and the side receptor. However, in these cases, the water material (representing diatomaceous earth) provided the highest exposure rates. For all other receptor locations, concrete material (representing the sludge) provided the highest exposure rates, considering that the air material is not present in significant lengths to be representative of the buildup in these scenarios.

Table 3. Exposure rate results for Tank TK-710 (V-13).

Receptor	Buildup Material	Contact (mR/hr)	3 ft (mR/hr)
Side of Tank - Midway	Water	22.83	17.2
	Air	22.45	16.91
	Iron	13.59	10.24
	Concrete	17.84	13.44
Bottom	Iron	179	97.99
	Air	262.5	137.5
	Concrete	220.9	118.3
Bottom with Lead	Iron	39.17	18.28
	Lead	14.07	7.10
	Air	65.13	29.31
	Concrete	51.59	23.63
End of Tank	Iron	158.4	16.82
	Air	227	23.16
	Concrete	193.2	20.08
End of Tank with Lead	Iron	36.70	5.95
	Lead	12.43	2.2
	Air	62.62	9.8
	Concrete	48.98	7.8
Horizontal with Waste	Iron	158.5	26.61
	Air	227.2	37.84
	Concrete	165.4	17.17

Table 3. (continued).

Receptor	Buildup Material	Contact (mR/hr)	3 ft (mR/hr)
Horizontal with Lead	Iron	37.39	8.0
	Lead	12.61	2.8
	Air	63.91	13.46
	Concrete	93.22	19.82
Top of Tank	Water	17.07	13.55
	Air	16.79	13.33
	Iron	10.17	8.0
	Concrete	13.35	10.60

Table 4. Exposure rate results for Tank TK-709 (V-14).

Receptor	Buildup Material	Contact (mR/hr)	3 ft (mR/hr)
Side of Tank - Midway	Water	12.05	9.02
	Air	11.89	8.9
	Iron	7.52	5.6
	Concrete	9.65	7.23
Bottom	Iron	188.7	61.95
	Air	262.1	80.23
	Concrete	226.6	71.81
Bottom with Lead	Iron	39.17	18.28
	Lead	14.07	7.10
	Air	65.13	29.31
	Concrete	51.59	23.63
End of Tank	Iron	138.8	5.92
	Air	187.9	8.09
	Concrete	164.5	7.04
End of Tank with Lead	Iron	34.74	2.18
	Lead	12.69	0.82
	Air	57.34	3.56
	Concrete	45.58	2.85
Horizontal with Waste	Iron	139.4	14.14
	Air	189.1	20.10
	Concrete	165.4	17.17
Horizontal with Lead	Iron	34.81	4.23
	Lead	12.7	1.5

Table 4. (continued).

Receptor	Buildup Material	Contact (mR/hr)	3 ft (mR/hr)
Top of Tank	Air	57.47	7.1
	Concrete	45.68	5.6
Top of Tank	Water	8.76	6.93
	Air	8.64	6.84
	Iron	5.47	4.34
	Concrete	7.02	5.563

3. SHIELDING REQUIREMENTS

Lead blanket shielding requirements for the removal of the tanks from the ground, in which workers are required to weld brackets to the tanks, were evaluated. Concrete shielding requirements were evaluated for the tanks once they are place in the TAN-607A High Bay.

3.1 Radionuclide Inventory

The exposure rate calculations presented in Section 2 were based on sludge samples. The resulting exposure rates were lower than those presented by Bechtel BWXT Idaho, LLC in EDF-4718. The exposure rates in EDF-4718 were developed based upon a mixed material for the sludge and on the radionuclide inventory presented in Table B-3 of EDF-4453.

Since the assumptions in EDF-4718 provided higher modeled exposure rates, the inventory and sludge material files from the EDF were used in the shielding calculations to ensure that a sufficient thickness of materials was used for shielding the workers.

3.2 Material and Geometry Assumptions

The sludge and other material in the tanks were modeled as a uniformly mixed, rectangular volume source with an estimated 6 in. of uniform dense material that is 3 ft in width and 50 ft in length for Tank V-14, and 12 in. of uniform dense material that is 3 ft in width and 50 ft in length for Tank V-13. The radionuclides are assumed to be uniformly distributed throughout the volume of the material in each tank. These geometries and assumptions are the same as those used in EDF-4718.

The source material density of 1.0098 g/cm³ was derived from EDF-4453 according to EDF-4718, with the density calculated from a weighted average of the densities of the sludge material, water, and diatomaceous earth.

3.3 Lead Shielding Requirements

The lead shielding requirements were evaluated for workers welding brackets to the tanks and removing sand from the cradle area between the tanks. Personnel removing sand from the outsides of the tank cradles will be in lower exposure fields than the welders because of increased distance from the tanks and shielding from the soil. The tanks will be partially

excavated as shown in Figure 3. The lead shielding requirements were evaluated for the location at 45 degrees from the upper quadrant of the tanks.

The lead shielding was evaluated in terms of the number of blankets of 4 mm (0.157 in.) in thickness, which is a standard (10 lb/ft²) available lead blanket. The number of lead blankets required to reduce the exposure rate to 0.5 mR/hr was evaluated for a location of 2 in. from the shield. The results of the analysis are provided in Table 5.

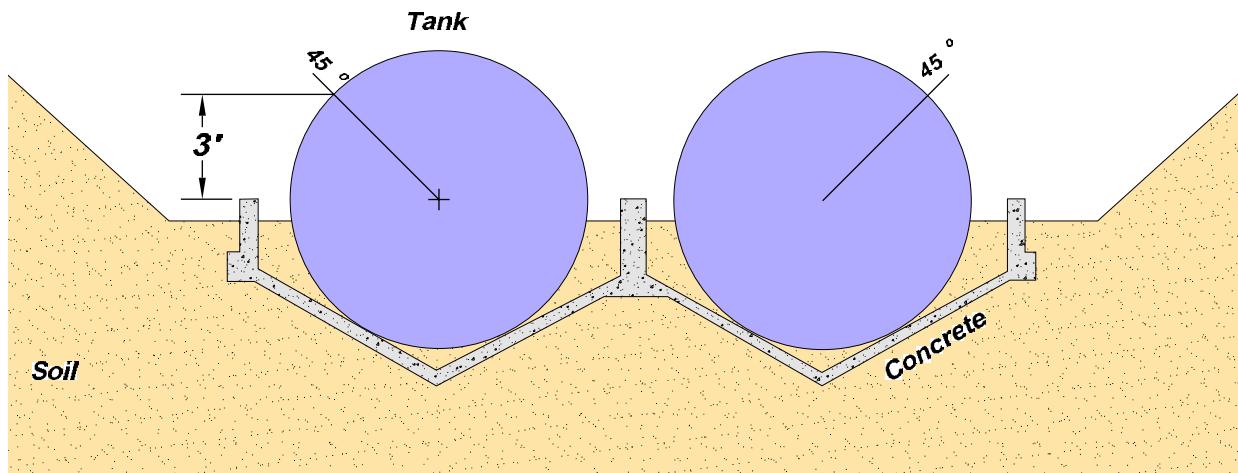


Figure 3. Conceptualization of tank removal geometries.

Table 5. Lead shielding requirements.

Tank	Number of 4-mm Lead Blankets	Exposure Rate (mR/hr) at 2 in.
V-13	4	0.78
	5	0.31
V-14	4	0.91
	5	0.35
Between the Tanks	9	1.8 (at 3')

The lead shielding analysis indicates that five 4-mm lead blankets would be required to reduce the exposure rate at 2 in. from the lead shield below an exposure of 0.5 mR/hr.

3.4 Concrete Shielding Requirements

Concrete shielding requirements were evaluated for the tanks once they are placed in the TAN-607A High Bay. The concrete shielding was evaluated in terms of the thickness in inches required to reduce exposure rate to 0.5 mR/hr located 2 in. from the shield. The exposure rates were evaluated at the centerlines of the side of the tanks for conservatism. The exposure rates near the end of the tanks are typically lower due to geometry. The results of the analysis are provided in Table 6.

Table 6. Concrete shielding requirements.

Tank	Concrete (in.)	Exposure Rate (mR/hr) at 2 in.
V-13	12	0.47
	13	0.42
V-14	12	0.54
	13	0.48

The results of the concrete shielding analysis indicate that 13 in. of concrete shielding would be required to reduce the exposure rate at 2 in. from the concrete shield below the exposure limit of 0.5 mR/hr.

4. SUMMARY

Modeling of the exposure rates from the PM-2A tanks (V-13 and V-14) demonstrates that shielding will be necessary to limit personnel exposure during welding and sand removal tasks and for storage in the TAN-607A High Bay. Lead blankets will provide effective, portable personnel shielding during removal tasks, and concrete panels will be used in the TAN-607A High Bay to allow unrestricted occupancy.

When the PM-2A tanks have been uncovered, Bechtel BWXT Idaho, LLC radiation technicians will survey the tanks and determine the actual exposure fields associated with each tank. Shielding requirements will then be reevaluated to reflect the quantities required to maintain personnel radiation exposures as low as reasonably achievable. After placement of shielding, exposure rates will be measured with field instruments prior to work to ensure acceptable exposure levels for personnel performing tank-related tasks.

5. REFERENCES

EDF-4453, 2004, "Hazard Assessment Calculation for Hazard Classification for PM-2A Tanks (V-13 and V-14)," 2004.

EDF-4718, 2003, "Exposure Rate Estimates for Excavation, Extraction, Transportation, Treatment, Sampling and Storage of the TAN PM-2A Waste Tanks," 2003.

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MicroShield, Version 6.02, Onley, Maryland: Grove Engineering, 2003.

Attachment I

MicroShield Output Files

Page :1
DOS File :V-13 45 angle.ms6
Run Date : April 16, 2004
Run Time : 12:02:49 PM
Duration : 00:00:12

File Ref :
Date :
By :
Checked :

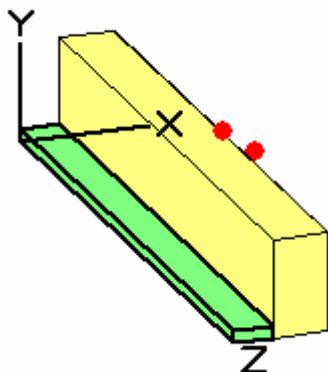
Case Title: PM-2A Tanks
Description: V-13 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	101.6 cm	(3 ft 4.0 in.)
Width	1.5e+3 cm	(50 ft)
Height	30.48 cm	(1 ft)

Dose Points

A	X	Y	Z
# 1	2.48e+02 cm 8 ft 1.6 in.	190.5 cm 6 ft 3.0 in.	762 cm 25 ft
# 2	2.76e+02 cm 9 ft 0.6 in.	190.5 cm 6 ft 3.0 in.	762 cm 25 ft
# 3	3.37e+02 cm 11 ft 0.6 in.	190.5 cm 6 ft 3.0 in.	762 cm 25 ft
# 4	4.28e+02 cm 14 ft 0.6 in.	190.5 cm 6 ft 3.0 in.	762 cm 25 ft
# 5	2.48e+02 cm 8 ft 1.6 in.	254 cm 8 ft 4.0 in.	762 cm 25 ft



Shields

Shield N	Dimension	Material	Density
Source	2.88e+05 in. ³	V123 SLUDGE	1.02
Shield 1	.550 in.	Air	0.00122
Shield 2	.562 in.	Iron	7.86
Shield 3	1.0 in.	Air	0.00122
Air Gap		Air	0.00122
Immersion		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ag-108m	8.4400e-004	3.1228e+007	1.7883e-004	6.6168e+000
Am-241	2.3900e-003	8.8430e+007	5.0641e-004	1.8737e+001
Am-243	6.7700e-006	2.5049e+005	1.4345e-006	5.3076e-002
Ba-137m	1.7879e+001	6.6154e+011	3.7884e+000	1.4017e+005
C-14	1.5900e-004	5.8830e+006	3.3690e-005	1.2465e+000
Cm-243	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Cm-244	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Co-60	8.9100e-002	3.2967e+009	1.8879e-002	6.9853e+002
Cs-137	1.8900e+001	6.9930e+011	4.0047e+000	1.4817e+005
Fe-55	2.7800e-003	1.0286e+008	5.8905e-004	2.1795e+001
H-3	1.3900e-001	5.1430e+009	2.9452e-002	1.0897e+003
Ni-59	2.8700e-002	1.0619e+009	6.0812e-003	2.2500e+002
Ni-63	3.0500e+000	1.1285e+011	6.4626e-001	2.3912e+004
Np-237	2.3300e-005	8.6210e+005	4.9370e-006	1.8267e-001
Pu-238	1.3200e-002	4.8840e+008	2.7969e-003	1.0349e+002
Pu-239	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-240	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-241	1.2300e-002	4.5510e+008	2.6062e-003	9.6430e+001
Sr-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005
Tc-99	1.5200e-003	5.6240e+007	3.2207e-004	1.1917e+001
U-233	5.0200e-005	1.8574e+006	1.0637e-005	3.9356e-001
U-234	7.8400e-003	2.9008e+008	1.6612e-003	6.1464e+001
U-235	2.5000e-004	9.2500e+006	5.2972e-005	1.9600e+000
U-236	3.1900e-005	1.1803e+006	6.7592e-006	2.5009e-001
U-238	5.4500e-005	2.0165e+006	1.1548e-005	4.2727e-001
Y-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	10
Y Direction	20
Z Direction	20

Results – Dose Point # 1 – (97.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	8.983e-25	0.000e+00	7.705e-26
0.02	2.048e+07	2.980e-153	7.007e-27	1.032e-154	2.427e-28
0.03	3.897e+10	3.562e-48	2.527e-22	3.530e-50	2.505e-24
0.04	9.195e+09	5.479e-22	1.438e-19	2.423e-24	6.362e-22
0.05	5.277e+05	4.025e-16	1.888e-13	1.072e-18	5.030e-16
0.06	3.217e+07	1.213e-09	5.352e-07	2.409e-12	1.063e-09
0.08	2.752e+06	1.076e-06	2.353e-04	1.702e-09	3.724e-07
0.1	4.835e+06	7.307e-05	7.875e-03	1.118e-07	1.205e-05
0.15	1.467e+06	5.570e-04	1.959e-02	9.173e-07	3.227e-05
0.2	6.784e+06	8.220e-03	1.647e-01	1.451e-05	2.906e-04
0.3	1.145e+06	4.202e-03	4.700e-02	7.971e-06	8.915e-05
0.4	2.807e+07	1.969e-01	1.579e+00	3.836e-04	3.077e-03
0.6	5.953e+11	9.706e+03	5.224e+04	1.894e+01	1.020e+02
0.8	2.826e+07	8.190e-01	3.446e+00	1.558e-03	6.555e-03
1.0	3.297e+09	1.480e+02	5.253e+02	2.728e-01	9.682e-01
1.5	3.297e+09	3.195e+02	8.665e+02	5.376e-01	1.458e+00
Totals	6.576e+11	1.017e+04	5.364e+04	1.976e+01	1.044e+02

Results – Dose Point # 2 – (108.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	8.143e-25	0.000e+00	6.985e-26
0.02	2.048e+07	5.290e-149	6.352e-27	1.832e-150	2.200e-28
0.03	3.897e+10	8.798e-47	2.291e-22	8.720e-49	2.270e-24
0.04	9.195e+09	2.413e-21	6.082e-19	1.067e-23	2.690e-21
0.05	5.277e+05	9.428e-16	4.188e-13	2.512e-18	1.116e-15
0.06	3.217e+07	2.123e-09	8.819e-07	4.217e-12	1.752e-09
0.08	2.752e+06	1.433e-06	2.914e-04	2.267e-09	4.611e-07
0.1	4.835e+06	8.582e-05	8.561e-03	1.313e-07	1.310e-05
0.15	1.467e+06	5.830e-04	1.913e-02	9.600e-07	3.151e-05
0.2	6.784e+06	8.297e-03	1.564e-01	1.464e-05	2.761e-04
0.3	1.145e+06	4.128e-03	4.395e-02	7.830e-06	8.336e-05
0.4	2.807e+07	1.910e-01	1.469e+00	3.721e-04	2.861e-03
0.6	5.953e+11	9.284e+03	4.835e+04	1.812e+01	9.437e+01
0.8	2.826e+07	7.768e-01	3.180e+00	1.477e-03	6.049e-03
1.0	3.297e+09	1.396e+02	4.840e+02	2.573e-01	8.921e-01
1.5	3.297e+09	2.986e+02	7.962e+02	5.024e-01	1.340e+00
Totals	6.576e+11	9.723e+03	4.963e+04	1.888e+01	9.661e+01

Results - Dose Point # 3 - (132.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	4.648e-310	6.602e-25	3.986e-311	5.663e-26
0.02	2.048e+07	6.690e-143	5.150e-27	2.317e-144	1.784e-28
0.03	3.897e+10	9.019e-45	1.857e-22	8.939e-47	1.841e-24
0.04	9.195e+09	2.085e-20	4.955e-18	9.222e-23	2.192e-20
0.05	5.277e+05	3.251e-15	1.327e-12	8.660e-18	3.535e-15
0.06	3.217e+07	4.650e-09	1.746e-06	9.235e-12	3.467e-09
0.08	2.752e+06	2.008e-06	3.626e-04	3.177e-09	5.737e-07
0.1	4.835e+06	9.889e-05	8.764e-03	1.513e-07	1.341e-05
0.15	1.467e+06	5.673e-04	1.685e-02	9.343e-07	2.775e-05
0.2	6.784e+06	7.670e-03	1.327e-01	1.354e-05	2.343e-04
0.3	1.145e+06	3.673e-03	3.650e-02	6.968e-06	6.923e-05
0.4	2.807e+07	1.670e-01	1.211e+00	3.254e-04	2.359e-03
0.6	5.953e+11	7.965e+03	3.963e+04	1.555e+01	7.735e+01
0.8	2.826e+07	6.588e-01	2.598e+00	1.253e-03	4.942e-03
1.0	3.297e+09	1.174e+02	3.947e+02	2.165e-01	7.276e-01
1.5	3.297e+09	2.483e+02	6.477e+02	4.177e-01	1.090e+00
Totals	6.576e+11	8.331e+03	4.068e+04	1.618e+01	7.918e+01

Results - Dose Point # 4 - (168.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	2.973e-299	4.925e-25	2.550e-300	4.225e-26
0.02	2.048e+07	6.055e-138	3.842e-27	2.097e-139	1.331e-28
0.03	3.897e+10	3.970e-43	1.386e-22	3.934e-45	1.373e-24
0.04	9.195e+09	1.227e-19	2.768e-17	5.426e-22	1.224e-19
0.05	5.277e+05	8.477e-15	3.190e-12	2.258e-17	8.498e-15
0.06	3.217e+07	7.883e-09	2.684e-06	1.566e-11	5.332e-09
0.08	2.752e+06	2.273e-06	3.705e-04	3.597e-09	5.862e-07
0.1	4.835e+06	9.515e-05	7.666e-03	1.456e-07	1.173e-05
0.15	1.467e+06	4.774e-04	1.312e-02	7.861e-07	2.160e-05
0.2	6.784e+06	6.199e-03	1.003e-01	1.094e-05	1.770e-04
0.3	1.145e+06	2.881e-03	2.709e-02	5.465e-06	5.140e-05
0.4	2.807e+07	1.292e-01	8.938e-01	2.518e-04	1.741e-03
0.6	5.953e+11	6.069e+03	2.912e+04	1.185e+01	5.683e+01
0.8	2.826e+07	4.975e-01	1.905e+00	9.463e-04	3.623e-03
1.0	3.297e+09	8.814e+01	2.891e+02	1.625e-01	5.329e-01
1.5	3.297e+09	1.846e+02	4.740e+02	3.107e-01	7.974e-01
Totals	6.576e+11	6.343e+03	2.988e+04	1.232e+01	5.817e+01

Results – Dose Point # 5 – (97.5625,100,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	7.298e-25	0.000e+00	6.260e-26
0.02	2.048e+07	9.436e-173	5.693e-27	3.269e-174	1.972e-28
0.03	3.897e+10	1.851e-54	2.053e-22	1.835e-56	2.035e-24
0.04	9.195e+09	7.159e-25	6.364e-22	3.166e-27	2.814e-24
0.05	5.277e+05	9.325e-18	5.550e-15	2.484e-20	1.478e-17
0.06	3.217e+07	1.027e-10	5.808e-08	2.040e-13	1.154e-10
0.08	2.752e+06	2.686e-07	7.512e-05	4.250e-10	1.189e-07
0.1	4.835e+06	2.798e-05	3.827e-03	4.280e-08	5.856e-06
0.15	1.467e+06	3.068e-04	1.325e-02	5.052e-07	2.181e-05
0.2	6.784e+06	5.055e-03	1.209e-01	8.922e-06	2.133e-04
0.3	1.145e+06	2.805e-03	3.616e-02	5.320e-06	6.859e-05
0.4	2.807e+07	1.364e-01	1.234e+00	2.659e-04	2.405e-03
0.6	5.953e+11	7.009e+03	4.141e+04	1.368e+01	8.083e+01
0.8	2.826e+07	6.061e-01	2.753e+00	1.153e-03	5.237e-03
1.0	3.297e+09	1.114e+02	4.217e+02	2.054e-01	7.772e-01
1.5	3.297e+09	2.468e+02	7.007e+02	4.152e-01	1.179e+00
Totals	6.576e+11	7.368e+03	4.254e+04	1.430e+01	8.279e+01

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Run Time : 10:18:05 AM
Duration : 00:00:11

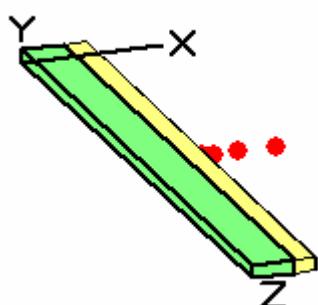
File Ref :
Date :
By :
Checked :

Case Title: PM-2A Tanks
Description: V-13 concrete shielding
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	101.6 cm	(3 ft 4.0 in.)
Width	1.5e+3 cm	(50 ft)
Height	30.48 cm	(1 ft)

Dose Points



A	X	Y	Z
# 1	1.58e+02 cm 5 ft 2.1 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 2	1.86e+02 cm 6 ft 1.1 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 3	2.47e+02 cm 8 ft 1.1 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 4	3.38e+02 cm 11 ft 1.1 in.	15.24 cm 6.0 in.	762 cm 25 ft

Shields

Shield N	Dimension	Material	Density
Source	2.88e+05 in. ³	V123 SLUDGE	1.02
Shield 1	.562 in.	Iron	7.85
Shield 2	19.5 in.	Concrete	2.35
Shield 3	1.0 in.	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ag-108m	8.4400e-004	3.1228e+007	1.7883e-004	6.6168e+000
Am-241	2.3900e-003	8.8430e+007	5.0641e-004	1.8737e+001
Am-243	6.7700e-006	2.5049e+005	1.4345e-006	5.3076e-002
Ba-137m	1.7879e+001	6.6154e+011	3.7884e+000	1.4017e+005
C-14	1.5900e-004	5.8830e+006	3.3690e-005	1.2465e+000
Cm-243	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Cm-244	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Co-60	8.9100e-002	3.2967e+009	1.8879e-002	6.9853e+002
Cs-137	1.8900e+001	6.9930e+011	4.0047e+000	1.4817e+005
Fe-55	2.7800e-003	1.0286e+008	5.8905e-004	2.1795e+001
H-3	1.3900e-001	5.1430e+009	2.9452e-002	1.0897e+003
Ni-59	2.8700e-002	1.0619e+009	6.0812e-003	2.2500e+002
Ni-63	3.0500e+000	1.1285e+011	6.4626e-001	2.3912e+004
Np-237	2.3300e-005	8.6210e+005	4.9370e-006	1.8267e-001
Pu-238	1.3200e-002	4.8840e+008	2.7969e-003	1.0349e+002
Pu-239	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-240	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-241	1.2300e-002	4.5510e+008	2.6062e-003	9.6430e+001
Sr-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005
Tc-99	1.5200e-003	5.6240e+007	3.2207e-004	1.1917e+001
U-233	5.0200e-005	1.8574e+006	1.0637e-005	3.9356e-001
U-234	7.8400e-003	2.9008e+008	1.6612e-003	6.1464e+001
U-235	2.5000e-004	9.2500e+006	5.2972e-005	1.9600e+000
U-236	3.1900e-005	1.1803e+006	6.7592e-006	2.5009e-001
U-238	5.4500e-005	2.0165e+006	1.1548e-005	4.2727e-001
Y-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005

**Buildup : The material reference is – Source
Integration Parameters**

X Direction	10
Y Direction	20
Z Direction	20

Results – Dose Point # 1 – (62.0625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	2.229e-24	0.000e+00	1.912e-25
0.02	2.048e+07	1.335e-310	1.343e-26	4.623e-312	4.651e-28
0.03	3.897e+10	2.438e-98	1.643e-22	2.416e-100	1.629e-24
0.04	9.195e+09	8.229e-47	3.472e-22	3.639e-49	1.535e-24
0.05	5.277e+05	3.471e-32	1.322e-25	9.245e-35	3.523e-28
0.06	3.217e+07	6.270e-22	5.802e-19	1.245e-24	1.153e-21
0.08	2.752e+06	5.509e-16	6.680e-13	8.717e-19	1.057e-15
0.1	4.835e+06	5.531e-13	6.681e-10	8.462e-16	1.022e-12
0.15	1.467e+06	7.296e-11	5.774e-08	1.201e-13	9.508e-11
0.2	6.784e+06	4.887e-09	2.369e-06	8.626e-12	4.181e-09
0.3	1.145e+06	1.702e-08	3.733e-06	3.229e-11	7.080e-09
0.4	2.807e+07	2.877e-06	3.483e-04	5.606e-09	6.786e-07
0.6	5.953e+11	7.807e-01	4.249e+01	1.524e-03	8.293e-02
0.8	2.826e+07	2.046e-04	6.567e-03	3.892e-07	1.249e-05
1.0	3.297e+09	8.513e-02	1.871e+00	1.569e-04	3.449e-03
1.5	3.297e+09	7.416e-01	8.847e+00	1.248e-03	1.488e-02
Totals	6.576e+11	1.608e+00	5.321e+01	2.929e-03	1.013e-01

Results – Dose Point # 2 – (73.0625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	1.668e-24	0.000e+00	1.430e-25
0.02	2.048e+07	2.574e-308	1.005e-26	8.915e-310	3.480e-28
0.03	3.897e+10	1.005e-97	1.230e-22	9.961e-100	1.219e-24
0.04	9.195e+09	1.230e-46	2.598e-22	5.439e-49	1.149e-24
0.05	5.277e+05	3.420e-32	9.896e-26	9.110e-35	2.636e-28
0.06	3.217e+07	5.057e-22	4.573e-19	1.004e-24	9.084e-22
0.08	2.752e+06	3.807e-16	4.529e-13	6.025e-19	7.168e-16
0.1	4.835e+06	3.675e-13	4.403e-10	5.623e-16	6.737e-13
0.15	1.467e+06	4.819e-11	3.862e-08	7.936e-14	6.360e-11
0.2	6.784e+06	3.265e-09	1.616e-06	5.762e-12	2.853e-09
0.3	1.145e+06	1.163e-08	2.619e-06	2.207e-11	4.968e-09
0.4	2.807e+07	2.003e-06	2.488e-04	3.903e-09	4.848e-07
0.6	5.953e+11	5.581e-01	3.101e+01	1.089e-03	6.054e-02
0.8	2.826e+07	1.487e-04	4.846e-03	2.828e-07	9.218e-06
1.0	3.297e+09	6.248e-02	1.389e+00	1.152e-04	2.560e-03
1.5	3.297e+09	5.505e-01	6.601e+00	9.263e-04	1.111e-02
Totals	6.576e+11	1.171e+00	3.901e+01	2.131e-03	7.421e-02

Results – Dose Point # 3 – (97.0625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	1.056e-24	0.000e+00	9.057e-26
0.02	2.048e+07	3.187e-307	6.362e-27	1.104e-308	2.204e-28
0.03	3.897e+10	1.387e-97	7.786e-23	1.375e-99	7.717e-25
0.04	9.195e+09	8.791e-47	1.645e-22	3.888e-49	7.275e-25
0.05	5.277e+05	1.953e-32	6.266e-26	5.204e-35	1.669e-28
0.06	3.217e+07	2.794e-22	2.534e-19	5.550e-25	5.034e-22
0.08	2.752e+06	2.230e-16	2.700e-13	3.528e-19	4.272e-16
0.1	4.835e+06	2.245e-13	2.742e-10	3.434e-16	4.195e-13
0.15	1.467e+06	3.048e-11	2.470e-08	5.018e-14	4.068e-11
0.2	6.784e+06	2.083e-09	1.037e-06	3.677e-12	1.830e-09
0.3	1.145e+06	7.452e-09	1.676e-06	1.414e-11	3.179e-09
0.4	2.807e+07	1.282e-06	1.586e-04	2.498e-09	3.090e-07
0.6	5.953e+11	3.555e-01	1.966e+01	6.939e-04	3.837e-02
0.8	2.826e+07	9.433e-05	3.063e-03	1.794e-07	5.826e-06
1.0	3.297e+09	3.954e-02	8.766e-01	7.289e-05	1.616e-03
1.5	3.297e+09	3.477e-01	4.169e+00	5.851e-04	7.015e-03
Totals	6.576e+11	7.429e-01	2.471e+01	1.352e-03	4.701e-02

Results – Dose Point # 4 – (133.0625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	6.517e-25	0.000e+00	5.590e-26
0.02	2.048e+07	4.504e-307	3.926e-27	1.560e-308	1.360e-28
0.03	3.897e+10	8.685e-98	4.806e-23	8.608e-100	4.763e-25
0.04	9.195e+09	5.058e-47	1.015e-22	2.237e-49	4.490e-25
0.05	5.277e+05	1.236e-32	3.867e-26	3.292e-35	1.030e-28
0.06	3.217e+07	1.831e-22	1.664e-19	3.637e-25	3.306e-22
0.08	2.752e+06	1.442e-16	1.737e-13	2.281e-19	2.749e-16
0.1	4.835e+06	1.429e-13	1.737e-10	2.187e-16	2.657e-13
0.15	1.467e+06	1.917e-11	1.550e-08	3.156e-14	2.552e-11
0.2	6.784e+06	1.307e-09	6.503e-07	2.307e-12	1.148e-09
0.3	1.145e+06	4.674e-09	1.053e-06	8.866e-12	1.998e-09
0.4	2.807e+07	8.051e-07	9.990e-05	1.569e-09	1.947e-07
0.6	5.953e+11	2.240e-01	1.244e+01	4.373e-04	2.427e-02
0.8	2.826e+07	5.963e-05	1.944e-03	1.134e-07	3.698e-06
1.0	3.297e+09	2.507e-02	5.580e-01	4.621e-05	1.029e-03
1.5	3.297e+09	2.217e-01	2.670e+00	3.730e-04	4.491e-03
Totals	6.576e+11	4.709e-01	1.567e+01	8.566e-04	2.980e-02

Page :1
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Run Date : April 16, 2004
Run Time : 10:36:33 AM
Duration : 00:00:12

File Ref :
Date :
By :
Checked :

Case Title: PM-2A Tanks
Description: V-13 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.5e+3 cm	(50 ft)
Width	101.6 cm	(3 ft 4.0 in.)
Height	30.48 cm	(1 ft)

Dose Points

A	X	Y	Z
# 1	1.58e+03 cm 51 ft 9.6 in.	15.24 cm 6.0 in.	50.8 cm 1 ft 8.0 in.
# 2	1.61e+03 cm 52 ft 8.6 in.	15.24 cm 6.0 in.	50.8 cm 1 ft 8.0 in.
# 3	1.67e+03 cm 54 ft 8.6 in.	15.24 cm 6.0 in.	50.8 cm 1 ft 8.0 in.
# 4	1.76e+03 cm 57 ft 8.6 in.	15.24 cm 6.0 in.	50.8 cm 1 ft 8.0 in.



Shields

Shield N	Dimension	Material	Density
Source	2.88e+05 in. ³	V123 SLUDGE	1.02
Shield 1	.562 in.	Iron	7.85
Shield 2	19.0 in.	Concrete	2.35
Shield 3	1.0 in.	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ag-108m	8.4400e-004	3.1228e+007	1.7883e-004	6.6168e+000
Am-241	2.3900e-003	8.8430e+007	5.0641e-004	1.8737e+001
Am-243	6.7700e-006	2.5049e+005	1.4345e-006	5.3076e-002
Ba-137m	1.7879e+001	6.6154e+011	3.7884e+000	1.4017e+005
C-14	1.5900e-004	5.8830e+006	3.3690e-005	1.2465e+000
Cm-243	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Cm-244	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Co-60	8.9100e-002	3.2967e+009	1.8879e-002	6.9853e+002
Cs-137	1.8900e+001	6.9930e+011	4.0047e+000	1.4817e+005
Fe-55	2.7800e-003	1.0286e+008	5.8905e-004	2.1795e+001
H-3	1.3900e-001	5.1430e+009	2.9452e-002	1.0897e+003
Ni-59	2.8700e-002	1.0619e+009	6.0812e-003	2.2500e+002
Ni-63	3.0500e+000	1.1285e+011	6.4626e-001	2.3912e+004
Np-237	2.3300e-005	8.6210e+005	4.9370e-006	1.8267e-001
Pu-238	1.3200e-002	4.8840e+008	2.7969e-003	1.0349e+002
Pu-239	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-240	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-241	1.2300e-002	4.5510e+008	2.6062e-003	9.6430e+001
Sr-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005
Tc-99	1.5200e-003	5.6240e+007	3.2207e-004	1.1917e+001
U-233	5.0200e-005	1.8574e+006	1.0637e-005	3.9356e-001
U-234	7.8400e-003	2.9008e+008	1.6612e-003	6.1464e+001
U-235	2.5000e-004	9.2500e+006	5.2972e-005	1.9600e+000
U-236	3.1900e-005	1.1803e+006	6.7592e-006	2.5009e-001
U-238	5.4500e-005	2.0165e+006	1.1548e-005	4.2727e-001
Y-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	10
Y Direction	20
Z Direction	20

Results – Dose Point # 1 – (621.5625,6,20) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	1.227e-24	0.000e+00	1.052e-25
0.02	2.048e+07	0.000e+00	7.391e-27	0.000e+00	2.560e-28
0.03	3.897e+10	3.981e-106	9.046e-23	3.945e-108	8.965e-25
0.04	9.195e+09	2.365e-50	1.911e-22	1.046e-52	8.452e-25
0.05	5.277e+05	3.532e-34	7.280e-26	9.410e-37	1.939e-28
0.06	3.217e+07	3.111e-23	3.484e-20	6.179e-26	6.920e-23
0.08	2.752e+06	9.949e-17	1.503e-13	1.574e-19	2.378e-16
0.1	4.835e+06	1.648e-13	2.512e-10	2.521e-16	3.843e-13
0.15	1.467e+06	3.469e-11	3.437e-08	5.712e-14	5.660e-11
0.2	6.784e+06	2.826e-09	1.675e-06	4.988e-12	2.957e-09
0.3	1.145e+06	1.206e-08	3.101e-06	2.287e-11	5.882e-09
0.4	2.807e+07	2.284e-06	3.138e-04	4.450e-09	6.114e-07
0.6	5.953e+11	7.029e-01	4.153e+01	1.372e-03	8.106e-02
0.8	2.826e+07	1.962e-04	6.636e-03	3.732e-07	1.262e-05
1.0	3.297e+09	8.442e-02	1.915e+00	1.556e-04	3.529e-03
1.5	3.297e+09	7.550e-01	9.019e+00	1.270e-03	1.517e-02
Totals	6.576e+11	1.543e+00	5.247e+01	2.798e-03	9.977e-02

Results – Dose Point # 2 – (632.5625,6,20) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	8.369e-25	0.000e+00	7.179e-26
0.02	2.048e+07	0.000e+00	5.042e-27	0.000e+00	1.747e-28
0.03	3.897e+10	3.864e-106	6.171e-23	3.829e-108	6.116e-25
0.04	9.195e+09	2.152e-50	1.304e-22	9.520e-53	5.766e-25
0.05	5.277e+05	3.031e-34	4.966e-26	8.073e-37	1.323e-28
0.06	3.217e+07	2.571e-23	2.867e-20	5.106e-26	5.694e-23
0.08	2.752e+06	7.894e-17	1.184e-13	1.249e-19	1.873e-16
0.1	4.835e+06	1.280e-13	1.931e-10	1.958e-16	2.954e-13
0.15	1.467e+06	2.623e-11	2.560e-08	4.319e-14	4.215e-11
0.2	6.784e+06	2.106e-09	1.227e-06	3.718e-12	2.166e-09
0.3	1.145e+06	8.815e-09	2.225e-06	1.672e-11	4.220e-09
0.4	2.807e+07	1.646e-06	2.218e-04	3.208e-09	4.322e-07
0.6	5.953e+11	4.958e-01	2.873e+01	9.678e-04	5.607e-02
0.8	2.826e+07	1.361e-04	4.517e-03	2.589e-07	8.591e-06
1.0	3.297e+09	5.780e-02	1.287e+00	1.065e-04	2.372e-03
1.5	3.297e+09	5.045e-01	5.922e+00	8.489e-04	9.964e-03
Totals	6.576e+11	1.058e+00	3.594e+01	1.923e-03	6.841e-02

Results – Dose Point # 3 – (656.5625,6,20) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	4.776e-25	0.000e+00	4.097e-26
0.02	2.048e+07	0.000e+00	2.877e-27	0.000e+00	9.967e-29
0.03	3.897e+10	3.295e-106	3.522e-23	3.266e-108	3.490e-25
0.04	9.195e+09	1.629e-50	7.440e-23	7.206e-53	3.291e-25
0.05	5.277e+05	2.131e-34	2.834e-26	5.676e-37	7.550e-29
0.06	3.217e+07	1.715e-23	1.900e-20	3.407e-26	3.774e-23
0.08	2.752e+06	4.902e-17	7.248e-14	7.757e-20	1.147e-16
0.1	4.835e+06	7.622e-14	1.127e-10	1.166e-16	1.725e-13
0.15	1.467e+06	1.486e-11	1.413e-08	2.448e-14	2.327e-11
0.2	6.784e+06	1.165e-09	6.598e-07	2.055e-12	1.165e-09
0.3	1.145e+06	4.729e-09	1.161e-06	8.970e-12	2.202e-09
0.4	2.807e+07	8.652e-07	1.135e-04	1.686e-09	2.211e-07
0.6	5.953e+11	2.532e-01	1.431e+01	4.942e-04	2.793e-02
0.8	2.826e+07	6.812e-05	2.209e-03	1.296e-07	4.202e-06
1.0	3.297e+09	2.848e-02	6.209e-01	5.250e-05	1.145e-03
1.5	3.297e+09	2.423e-01	2.794e+00	4.077e-04	4.701e-03
Totals	6.576e+11	5.240e-01	1.773e+01	9.545e-04	3.378e-02

Results – Dose Point # 4 – (692.5625,6,20) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	2.794e-25	0.000e+00	2.396e-26
0.02	2.048e+07	0.000e+00	1.683e-27	0.000e+00	5.830e-29
0.03	3.897e+10	2.415e-106	2.060e-23	2.393e-108	2.042e-25
0.04	9.195e+09	1.082e-50	4.352e-23	4.785e-53	1.925e-25
0.05	5.277e+05	1.297e-34	1.658e-26	3.456e-37	4.416e-29
0.06	3.217e+07	9.767e-24	1.074e-20	1.940e-26	2.133e-23
0.08	2.752e+06	2.585e-17	3.775e-14	4.091e-20	5.974e-17
0.1	4.835e+06	3.877e-14	5.648e-11	5.932e-17	8.642e-14
0.15	1.467e+06	7.289e-12	6.810e-09	1.200e-14	1.121e-11
0.2	6.784e+06	5.619e-10	3.130e-07	9.916e-13	5.524e-10
0.3	1.145e+06	2.240e-09	5.413e-07	4.250e-12	1.027e-09
0.4	2.807e+07	4.052e-07	5.238e-05	7.894e-10	1.021e-07
0.6	5.953e+11	1.167e-01	6.517e+00	2.279e-04	1.272e-02
0.8	2.826e+07	3.110e-05	9.975e-04	5.915e-08	1.897e-06
1.0	3.297e+09	1.291e-02	2.787e-01	2.379e-05	5.138e-04
1.5	3.297e+09	1.086e-01	1.244e+00	1.827e-04	2.093e-03
Totals	6.576e+11	2.383e-01	8.041e+00	4.344e-04	1.533e-02

Page :1
DOS File :V-13 Exposure.ms6
Run Date : April 14, 2004
Run Time : 10:43:15 AM
Duration : 00:00:19

File Ref :
Date :
By :
Checked :

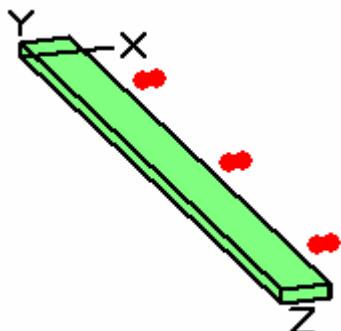
Case Title: PM-2A Tanks
Description: V-13 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	101.6 cm	(3 ft 4.0 in.)
Width	1.5e+3 cm	(50 ft)
Height	30.48 cm	(1 ft)

Dose Points

A	X	Y	Z
# 1	1.08e+02 cm 3 ft 6.6 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 2	1.36e+02 cm 4 ft 5.6 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 3	1.08e+02 cm 3 ft 6.6 in.	15.24 cm 6.0 in.	254 cm 8 ft 4.0 in.
# 4	1.36e+02 cm 4 ft 5.6 in.	15.24 cm 6.0 in.	254 cm 8 ft 4.0 in.
# 5	1.08e+02 cm 3 ft 6.6 in.	15.24 cm 6.0 in.	1270 cm 41 ft 8.0 in.
# 6	1.36e+02 cm 4 ft 5.6 in.	15.24 cm 6.0 in.	1270 cm 41 ft 8.0 in.



Shields

Shield N	Dimension	Material	Density
Source	2.88e+05 in. ³	V123 SLUDGE	1.02
Shield 1	.562 in.	Iron	7.85
Shield 2	1.0 in.	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ag-108m	8.4400e-004	3.1228e+007	1.7883e-004	6.6168e+000
Am-241	2.3900e-003	8.8430e+007	5.0641e-004	1.8737e+001
Am-243	6.7700e-006	2.5049e+005	1.4345e-006	5.3076e-002
Ba-137m	1.7879e+001	6.6154e+011	3.7884e+000	1.4017e+005
C-14	1.5900e-004	5.8830e+006	3.3690e-005	1.2465e+000
Cm-243	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Cm-244	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Co-60	8.9100e-002	3.2967e+009	1.8879e-002	6.9853e+002
Cs-137	1.8900e+001	6.9930e+011	4.0047e+000	1.4817e+005
Fe-55	2.7800e-003	1.0286e+008	5.8905e-004	2.1795e+001
H-3	1.3900e-001	5.1430e+009	2.9452e-002	1.0897e+003
Ni-59	2.8700e-002	1.0619e+009	6.0812e-003	2.2500e+002
Ni-63	3.0500e+000	1.1285e+011	6.4626e-001	2.3912e+004
Np-237	2.3300e-005	8.6210e+005	4.9370e-006	1.8267e-001
Pu-238	1.3200e-002	4.8840e+008	2.7969e-003	1.0349e+002
Pu-239	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-240	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-241	1.2300e-002	4.5510e+008	2.6062e-003	9.6430e+001
Sr-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005
Tc-99	1.5200e-003	5.6240e+007	3.2207e-004	1.1917e+001
U-233	5.0200e-005	1.8574e+006	1.0637e-005	3.9356e-001
U-234	7.8400e-003	2.9008e+008	1.6612e-003	6.1464e+001
U-235	2.5000e-004	9.2500e+006	5.2972e-005	1.9600e+000
U-236	3.1900e-005	1.1803e+006	6.7592e-006	2.5009e-001
U-238	5.4500e-005	2.0165e+006	1.1548e-005	4.2727e-001
Y-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	10
Y Direction	20
Z Direction	20

Results – Dose Point # 1 – (42.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	5.916e-24	0.000e+00	5.074e-25
0.02	2.048e+07	3.225e-168	3.564e-26	1.117e-169	1.235e-27
0.03	3.897e+10	2.150e-51	4.362e-22	2.131e-53	4.323e-24
0.04	9.195e+09	1.893e-22	1.317e-20	8.374e-25	5.823e-23
0.05	5.277e+05	9.749e-16	1.324e-13	2.597e-18	3.528e-16
0.06	3.217e+07	5.643e-09	8.979e-07	1.121e-11	1.783e-09
0.08	2.752e+06	7.173e-06	7.941e-04	1.135e-08	1.257e-06
0.1	4.835e+06	5.353e-04	3.576e-02	8.190e-07	5.470e-05
0.15	1.467e+06	4.282e-03	1.112e-01	7.052e-06	1.831e-04
0.2	6.784e+06	6.329e-02	9.824e-01	1.117e-04	1.734e-03
0.3	1.145e+06	3.201e-02	2.900e-01	6.072e-05	5.501e-04
0.4	2.807e+07	1.481e+00	9.892e+00	2.886e-03	1.927e-02
0.6	5.953e+11	7.128e+04	3.287e+05	1.391e+02	6.415e+02
0.8	2.826e+07	5.890e+00	2.169e+01	1.120e-02	4.125e-02
1.0	3.297e+09	1.046e+03	3.303e+03	1.928e+00	6.088e+00
1.5	3.297e+09	2.188e+03	5.431e+03	3.681e+00	9.138e+00
Totals	6.576e+11	7.452e+04	3.374e+05	1.447e+02	6.568e+02

Results – Dose Point # 2 – (53.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	1.845e-291	3.005e-24	1.583e-292	2.577e-25
0.02	2.048e+07	4.924e-133	1.810e-26	1.706e-134	6.271e-28
0.03	3.897e+10	2.812e-40	2.216e-22	2.787e-42	2.196e-24
0.04	9.195e+09	1.165e-17	5.805e-16	5.153e-20	2.568e-18
0.05	5.277e+05	2.828e-13	2.514e-11	7.534e-16	6.698e-14
0.06	3.217e+07	1.448e-07	1.386e-05	2.877e-10	2.753e-08
0.08	2.752e+06	2.239e-05	1.384e-03	3.543e-08	2.190e-06
0.1	4.835e+06	7.133e-04	2.728e-02	1.091e-06	4.174e-05
0.15	1.467e+06	2.901e-03	5.090e-02	4.777e-06	8.381e-05
0.2	6.784e+06	3.560e-02	4.155e-01	6.283e-05	7.334e-04
0.3	1.145e+06	1.586e-02	1.201e-01	3.009e-05	2.278e-04
0.4	2.807e+07	6.969e-01	4.104e+00	1.358e-03	7.997e-03
0.6	5.953e+11	3.200e+04	1.378e+05	6.246e+01	2.689e+02
0.8	2.826e+07	2.590e+00	9.166e+00	4.925e-03	1.744e-02
1.0	3.297e+09	4.551e+02	1.407e+03	8.388e-01	2.594e+00
1.5	3.297e+09	9.445e+02	2.352e+03	1.589e+00	3.957e+00
Totals	6.576e+11	3.340e+04	1.415e+05	6.489e+01	2.755e+02

Results – Dose Point # 3 – (42.5625,6,100) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	5.722e-24	0.000e+00	4.908e-25
0.02	2.048e+07	2.556e-147	3.447e-26	8.855e-149	1.194e-27
0.03	3.897e+10	7.643e-45	4.219e-22	7.575e-47	4.181e-24
0.04	9.195e+09	1.361e-19	7.739e-18	6.021e-22	3.423e-20
0.05	5.277e+05	3.549e-14	3.856e-12	9.455e-17	1.027e-14
0.06	3.217e+07	5.667e-08	6.879e-06	1.126e-10	1.366e-08
0.08	2.752e+06	2.395e-05	1.909e-03	3.790e-08	3.021e-06
0.1	4.835e+06	1.121e-03	5.311e-02	1.715e-06	8.125e-05
0.15	1.467e+06	5.977e-03	1.166e-01	9.842e-06	1.921e-04
0.2	6.784e+06	7.814e-02	9.699e-01	1.379e-04	1.712e-03
0.3	1.145e+06	3.613e-02	2.815e-01	6.853e-05	5.339e-04
0.4	2.807e+07	1.607e+00	9.597e+00	3.131e-03	1.870e-02
0.6	5.953e+11	7.438e+04	3.200e+05	1.452e+02	6.246e+02
0.8	2.826e+07	6.029e+00	2.115e+01	1.147e-02	4.023e-02
1.0	3.297e+09	1.059e+03	3.228e+03	1.952e+00	5.951e+00
1.5	3.297e+09	2.184e+03	5.324e+03	3.675e+00	8.957e+00
Totals	6.576e+11	7.763e+04	3.286e+05	1.508e+02	6.396e+02

Results – Dose Point # 4 – (53.5625,6,100) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	3.697e-284	2.857e-24	3.171e-285	2.451e-25
0.02	2.048e+07	5.734e-130	1.721e-26	1.986e-131	5.963e-28
0.03	3.897e+10	1.718e-39	2.107e-22	1.703e-41	2.088e-24
0.04	9.195e+09	1.873e-17	9.082e-16	8.285e-20	4.017e-18
0.05	5.277e+05	2.819e-13	2.423e-11	7.510e-16	6.454e-14
0.06	3.217e+07	1.228e-07	1.156e-05	2.438e-10	2.296e-08
0.08	2.752e+06	1.947e-05	1.258e-03	3.082e-08	1.991e-06
0.1	4.835e+06	6.675e-04	2.685e-02	1.021e-06	4.108e-05
0.15	1.467e+06	2.864e-03	5.129e-02	4.716e-06	8.447e-05
0.2	6.784e+06	3.547e-02	4.182e-01	6.261e-05	7.381e-04
0.3	1.145e+06	1.588e-02	1.207e-01	3.011e-05	2.289e-04
0.4	2.807e+07	6.985e-01	4.122e+00	1.361e-03	8.031e-03
0.6	5.953e+11	3.210e+04	1.382e+05	6.266e+01	2.698e+02
0.8	2.826e+07	2.598e+00	9.194e+00	4.942e-03	1.749e-02
1.0	3.297e+09	4.566e+02	1.411e+03	8.417e-01	2.601e+00
1.5	3.297e+09	9.474e+02	2.356e+03	1.594e+00	3.964e+00
Totals	6.576e+11	3.351e+04	1.420e+05	6.510e+01	2.764e+02

Results – Dose Point # 5 – (42.5625,6,500) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	0.000e+00	5.722e-24	0.000e+00	4.908e-25
0.02	2.048e+07	2.556e-147	3.447e-26	8.855e-149	1.194e-27
0.03	3.897e+10	7.643e-45	4.219e-22	7.575e-47	4.181e-24
0.04	9.195e+09	1.361e-19	7.739e-18	6.021e-22	3.423e-20
0.05	5.277e+05	3.549e-14	3.856e-12	9.455e-17	1.027e-14
0.06	3.217e+07	5.667e-08	6.879e-06	1.126e-10	1.366e-08
0.08	2.752e+06	2.395e-05	1.909e-03	3.790e-08	3.021e-06
0.1	4.835e+06	1.121e-03	5.311e-02	1.715e-06	8.125e-05
0.15	1.467e+06	5.977e-03	1.166e-01	9.842e-06	1.921e-04
0.2	6.784e+06	7.814e-02	9.699e-01	1.379e-04	1.712e-03
0.3	1.145e+06	3.613e-02	2.815e-01	6.853e-05	5.339e-04
0.4	2.807e+07	1.607e+00	9.597e+00	3.131e-03	1.870e-02
0.6	5.953e+11	7.438e+04	3.200e+05	1.452e+02	6.246e+02
0.8	2.826e+07	6.029e+00	2.115e+01	1.147e-02	4.023e-02
1.0	3.297e+09	1.059e+03	3.228e+03	1.952e+00	5.951e+00
1.5	3.297e+09	2.184e+03	5.324e+03	3.675e+00	8.957e+00
Totals	6.576e+11	7.763e+04	3.286e+05	1.508e+02	6.396e+02

Results – Dose Point # 6 – (53.5625,6,500) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	3.697e-284	2.857e-24	3.171e-285	2.451e-25
0.02	2.048e+07	5.734e-130	1.721e-26	1.986e-131	5.963e-28
0.03	3.897e+10	1.718e-39	2.107e-22	1.703e-41	2.088e-24
0.04	9.195e+09	1.873e-17	9.082e-16	8.285e-20	4.017e-18
0.05	5.277e+05	2.819e-13	2.423e-11	7.510e-16	6.454e-14
0.06	3.217e+07	1.228e-07	1.156e-05	2.438e-10	2.296e-08
0.08	2.752e+06	1.947e-05	1.258e-03	3.082e-08	1.991e-06
0.1	4.835e+06	6.675e-04	2.685e-02	1.021e-06	4.108e-05
0.15	1.467e+06	2.864e-03	5.129e-02	4.716e-06	8.447e-05
0.2	6.784e+06	3.547e-02	4.182e-01	6.261e-05	7.381e-04
0.3	1.145e+06	1.588e-02	1.207e-01	3.011e-05	2.289e-04
0.4	2.807e+07	6.985e-01	4.122e+00	1.361e-03	8.031e-03
0.6	5.953e+11	3.210e+04	1.382e+05	6.266e+01	2.698e+02
0.8	2.826e+07	2.598e+00	9.194e+00	4.942e-03	1.749e-02
1.0	3.297e+09	4.566e+02	1.411e+03	8.417e-01	2.601e+00
1.5	3.297e+09	9.474e+02	2.356e+03	1.594e+00	3.964e+00
Totals	6.576e+11	3.351e+04	1.420e+05	6.510e+01	2.764e+02

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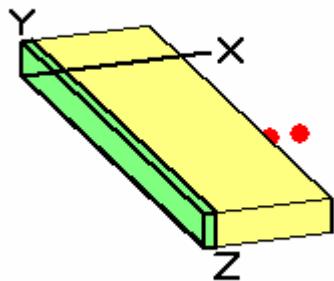
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By :
Checked :

Case Title: PM-2A Tanks
Description: V-13 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.5e+3 cm	(50 ft)
Height	101.6 cm	(3 ft 4.0 in.)

Dose Points



A	X	Y	Z
# 1	3.88e+02 cm 12 ft 8.6 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 2	4.15e+02 cm 13 ft 7.6 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 3	4.76e+02 cm 15 ft 7.6 in.	15.24 cm 6.0 in.	762 cm 25 ft
# 4	5.68e+02 cm 18 ft 7.6 in.	15.24 cm 6.0 in.	762 cm 25 ft

Shields

Shield N	Dimension	Material	Density
Source	2.88e+05 in. ³	V123 SLUDGE	1.02
Shield 1	138.0 in.	Air	0.00122
Shield 2	.562 in.	Iron	7.86
Shield 3	1.0 in.	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method – Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ag-108m	8.4400e-004	3.1228e+007	1.7883e-004	6.6168e+000
Am-241	2.3900e-003	8.8430e+007	5.0641e-004	1.8737e+001
Am-243	6.7700e-006	2.5049e+005	1.4345e-006	5.3076e-002
Ba-137m	1.7879e+001	6.6154e+011	3.7884e+000	1.4017e+005
C-14	1.5900e-004	5.8830e+006	3.3690e-005	1.2465e+000
Cm-243	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Cm-244	2.0900e-004	7.7330e+006	4.4285e-005	1.6385e+000
Co-60	8.9100e-002	3.2967e+009	1.8879e-002	6.9853e+002
Cs-137	1.8900e+001	6.9930e+011	4.0047e+000	1.4817e+005
Fe-55	2.7800e-003	1.0286e+008	5.8905e-004	2.1795e+001
H-3	1.3900e-001	5.1430e+009	2.9452e-002	1.0897e+003
Ni-59	2.8700e-002	1.0619e+009	6.0812e-003	2.2500e+002
Ni-63	3.0500e+000	1.1285e+011	6.4626e-001	2.3912e+004
Np-237	2.3300e-005	8.6210e+005	4.9370e-006	1.8267e-001
Pu-238	1.3200e-002	4.8840e+008	2.7969e-003	1.0349e+002
Pu-239	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-240	9.4700e-003	3.5039e+008	2.0066e-003	7.4243e+001
Pu-241	1.2300e-002	4.5510e+008	2.6062e-003	9.6430e+001
Sr-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005
Tc-99	1.5200e-003	5.6240e+007	3.2207e-004	1.1917e+001
U-233	5.0200e-005	1.8574e+006	1.0637e-005	3.9356e-001
U-234	7.8400e-003	2.9008e+008	1.6612e-003	6.1464e+001
U-235	2.5000e-004	9.2500e+006	5.2972e-005	1.9600e+000
U-236	3.1900e-005	1.1803e+006	6.7592e-006	2.5009e-001
U-238	5.4500e-005	2.0165e+006	1.1548e-005	4.2727e-001
Y-90	2.0000e+001	7.4000e+011	4.2378e+000	1.5680e+005

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	10
Y Direction	20
Z Direction	20

Results – Dose Point # 1 – (152.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	1.897e-279	5.654e-25	1.627e-280	4.850e-26
0.02	2.048e+07	1.627e-128	4.411e-27	5.636e-130	1.528e-28
0.03	3.897e+10	1.169e-39	1.591e-22	1.158e-41	1.576e-24
0.04	9.195e+09	7.431e-18	1.496e-15	3.286e-20	6.615e-18
0.05	5.277e+05	1.073e-13	3.455e-11	2.859e-16	9.203e-14
0.06	3.217e+07	4.766e-08	1.375e-05	9.467e-11	2.730e-08
0.08	2.752e+06	7.431e-06	1.040e-03	1.176e-08	1.645e-06
0.1	4.835e+06	2.480e-04	1.745e-02	3.794e-07	2.670e-05
0.15	1.467e+06	1.042e-03	2.570e-02	1.716e-06	4.231e-05
0.2	6.784e+06	1.287e-02	1.885e-01	2.271e-05	3.326e-04
0.3	1.145e+06	5.760e-03	4.925e-02	1.093e-05	9.342e-05
0.4	2.807e+07	2.535e-01	1.595e+00	4.939e-04	3.108e-03
0.6	5.953e+11	1.161e+04	5.064e+04	2.265e+01	9.884e+01
0.8	2.826e+07	9.326e-01	3.246e+00	1.774e-03	6.173e-03
1.0	3.297e+09	1.624e+02	4.844e+02	2.994e-01	8.928e-01
1.5	3.297e+09	3.284e+02	7.676e+02	5.525e-01	1.291e+00
Totals	6.576e+11	1.210e+04	5.190e+04	2.351e+01	1.010e+02

Results – Dose Point # 2 – (163.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	1.702e-279	5.127e-25	1.460e-280	4.398e-26
0.02	2.048e+07	1.545e-128	4.000e-27	5.352e-130	1.385e-28
0.03	3.897e+10	1.127e-39	1.442e-22	1.116e-41	1.430e-24
0.04	9.195e+09	7.069e-18	1.422e-15	3.126e-20	6.291e-18
0.05	5.277e+05	1.011e-13	3.251e-11	2.692e-16	8.660e-14
0.06	3.217e+07	4.461e-08	1.286e-05	8.861e-11	2.554e-08
0.08	2.752e+06	6.918e-06	9.679e-04	1.095e-08	1.532e-06
0.1	4.835e+06	2.304e-04	1.621e-02	3.524e-07	2.481e-05
0.15	1.467e+06	9.657e-04	2.378e-02	1.590e-06	3.916e-05
0.2	6.784e+06	1.191e-02	1.740e-01	2.102e-05	3.071e-04
0.3	1.145e+06	5.324e-03	4.539e-02	1.010e-05	8.611e-05
0.4	2.807e+07	2.341e-01	1.469e+00	4.562e-04	2.862e-03
0.6	5.953e+11	1.071e+04	4.659e+04	2.091e+01	9.093e+01
0.8	2.826e+07	8.602e-01	2.984e+00	1.636e-03	5.675e-03
1.0	3.297e+09	1.497e+02	4.450e+02	2.759e-01	8.202e-01
1.5	3.297e+09	3.023e+02	7.043e+02	5.087e-01	1.185e+00
Totals	6.576e+11	1.116e+04	4.774e+04	2.169e+01	9.294e+01

Results – Dose Point # 3 - (187.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	1.365e-279	4.209e-25	1.170e-280	3.610e-26
0.02	2.048e+07	1.416e-128	3.283e-27	4.906e-130	1.137e-28
0.03	3.897e+10	1.035e-39	1.184e-22	1.026e-41	1.174e-24
0.04	9.195e+09	6.346e-18	1.276e-15	2.807e-20	5.643e-18
0.05	5.277e+05	8.911e-14	2.863e-11	2.374e-16	7.628e-14
0.06	3.217e+07	3.895e-08	1.122e-05	7.737e-11	2.228e-08
0.08	2.752e+06	5.989e-06	8.384e-04	9.477e-09	1.327e-06
0.1	4.835e+06	1.986e-04	1.399e-02	3.039e-07	2.140e-05
0.15	1.467e+06	8.278e-04	2.031e-02	1.363e-06	3.345e-05
0.2	6.784e+06	1.018e-02	1.479e-01	1.796e-05	2.611e-04
0.3	1.145e+06	4.538e-03	3.844e-02	8.608e-06	7.292e-05
0.4	2.807e+07	1.993e-01	1.242e+00	3.883e-04	2.419e-03
0.6	5.953e+11	9.100e+03	3.929e+04	1.776e+01	7.670e+01
0.8	2.826e+07	7.297e-01	2.513e+00	1.388e-03	4.779e-03
1.0	3.297e+09	1.268e+02	3.743e+02	2.338e-01	6.899e-01
1.5	3.297e+09	2.555e+02	5.910e+02	4.299e-01	9.944e-01
Totals	6.576e+11	9.483e+03	4.026e+04	1.843e+01	7.839e+01

Results - Dose Point # 4 - (223.5625,6,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.450e+09	1.039e-279	3.234e-25	8.912e-281	2.773e-26
0.02	2.048e+07	1.266e-128	2.522e-27	4.386e-130	8.737e-29
0.03	3.897e+10	9.098e-40	9.097e-23	9.017e-42	9.016e-25
0.04	9.195e+09	5.426e-18	1.090e-15	2.400e-20	4.822e-18
0.05	5.277e+05	7.486e-14	2.404e-11	1.994e-16	6.405e-14
0.06	3.217e+07	3.243e-08	9.344e-06	6.442e-11	1.856e-08
0.08	2.752e+06	4.945e-06	6.934e-04	7.826e-09	1.097e-06
0.1	4.835e+06	1.632e-04	1.148e-02	2.496e-07	1.757e-05
0.15	1.467e+06	6.728e-04	1.640e-02	1.108e-06	2.701e-05
0.2	6.784e+06	8.229e-03	1.186e-01	1.452e-05	2.093e-04
0.3	1.145e+06	3.654e-03	3.065e-02	6.931e-06	5.814e-05
0.4	2.807e+07	1.601e-01	9.875e-01	3.120e-04	1.924e-03
0.6	5.953e+11	7.292e+03	3.116e+04	1.423e+01	6.083e+01
0.8	2.826e+07	5.835e-01	1.989e+00	1.110e-03	3.783e-03
1.0	3.297e+09	1.012e+02	2.958e+02	1.866e-01	5.452e-01
1.5	3.297e+09	2.032e+02	4.657e+02	3.419e-01	7.835e-01
Totals	6.576e+11	7.597e+03	3.193e+04	1.476e+01	6.216e+01

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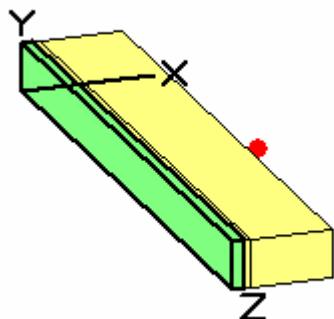
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By :
Checked :

Case Title: PM-2A V-13

Description: Dose at angle of 45 degrees on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	289.56 cm 9 ft 6.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	379.73 cm 12 ft 5.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	8.0 in.	Water	0.8
Shield 2	93.0 in.	Air	0.00122
Shield 3	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method – Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is – Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results – Dose Point # 1 – (114,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.011e-260	9.639e-26	1.378e-260	6.607e-26
0.0318	5.862e+09	6.882e-33	6.741e-23	5.732e-35	5.615e-25
0.0322	1.082e+10	1.362e-31	1.363e-22	1.097e-33	1.097e-24
0.0364	3.936e+09	4.278e-23	8.412e-21	2.431e-25	4.779e-23
0.6616	2.548e+11	1.407e+03	1.149e+04	2.728e+00	2.228e+01
0.6938	2.306e+05	1.433e-03	1.108e-02	2.766e-06	2.140e-05
1.1732	1.413e+09	3.123e+01	1.409e+02	5.581e-02	2.518e-01
1.3325	1.413e+09	4.195e+01	1.692e+02	7.279e-02	2.936e-01
Totals	2.812e+11	1.481e+03	1.180e+04	2.857e+00	2.283e+01

Results – Dose Point # 2 – (149.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.700e-260	6.743e-26	1.165e-260	4.622e-26
0.0318	5.862e+09	6.213e-33	4.715e-23	5.175e-35	3.928e-25
0.0322	1.082e+10	1.226e-31	9.538e-23	9.870e-34	7.676e-25
0.0364	3.936e+09	3.729e-23	7.294e-21	2.119e-25	4.144e-23
0.6616	2.548e+11	1.062e+03	8.659e+03	2.059e+00	1.679e+01
0.6938	2.306e+05	1.081e-03	8.347e-03	2.088e-06	1.612e-05
1.1732	1.413e+09	2.354e+01	1.058e+02	4.206e-02	1.892e-01
1.3325	1.413e+09	3.160e+01	1.270e+02	5.483e-02	2.203e-01
Totals	2.812e+11	1.117e+03	8.892e+03	2.156e+00	1.720e+01

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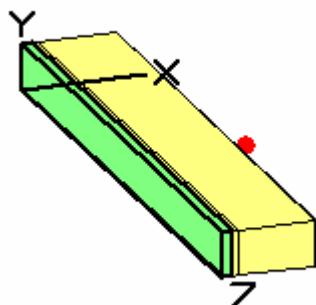
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Date :
By :
Checked :

Case Title: PM-2A V-13

Description: Dose at angle of 45 degrees on side of tank
Geometry: 13 – Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)



Dose Points

A	X	Y	Z
# 1	289.56 cm 9 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	379.73 cm 12 ft 5.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	93.0 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is – Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (114,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.011e-260	9.193e-26	1.378e-260	6.301e-26
0.0318	5.862e+09	6.882e-33	5.067e-23	5.732e-35	4.220e-25
0.0322	1.082e+10	1.362e-31	1.016e-22	1.097e-33	8.180e-25
0.0364	3.936e+09	4.278e-23	6.145e-21	2.431e-25	3.491e-23
0.6616	2.548e+11	1.407e+03	1.130e+04	2.728e+00	2.191e+01
0.6938	2.306e+05	1.433e-03	1.091e-02	2.766e-06	2.106e-05
1.1732	1.413e+09	3.123e+01	1.401e+02	5.581e-02	2.504e-01
1.3325	1.413e+09	4.195e+01	1.685e+02	7.279e-02	2.924e-01
Totals	2.812e+11	1.481e+03	1.161e+04	2.857e+00	2.245e+01

Results – Dose Point # 2 – (149.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.700e-260	6.431e-26	1.165e-260	4.408e-26
0.0318	5.862e+09	6.213e-33	3.544e-23	5.175e-35	2.952e-25
0.0322	1.082e+10	1.226e-31	7.111e-23	9.870e-34	5.722e-25
0.0364	3.936e+09	3.729e-23	5.332e-21	2.119e-25	3.029e-23
0.6616	2.548e+11	1.062e+03	8.513e+03	2.059e+00	1.650e+01
0.6938	2.306e+05	1.081e-03	8.217e-03	2.088e-06	1.587e-05
1.1732	1.413e+09	2.354e+01	1.053e+02	4.206e-02	1.881e-01
1.3325	1.413e+09	3.160e+01	1.265e+02	5.483e-02	2.194e-01
Totals	2.812e+11	1.117e+03	8.745e+03	2.156e+00	1.691e+01

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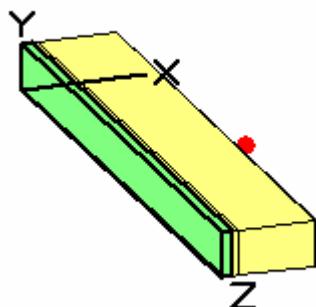
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Date :
By :
Checked :

Case Title: PM-2A V-13

Description: Dose at angle of 45 degrees on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	289.56 cm 9 ft 6.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	379.73 cm 12 ft 5.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	8.0 in.	Water	0.8
Shield 2	93.0 in.	Air	0.00122
Shield 3	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method – Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 3
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results – Dose Point # 1 – (114,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.011e-260	4.986e-26	1.378e-260	3.417e-26
0.0318	5.862e+09	6.882e-33	7.737e-25	5.732e-35	6.445e-27
0.0322	1.082e+10	1.362e-31	1.450e-24	1.097e-33	1.167e-26
0.0364	3.936e+09	4.278e-23	5.076e-23	2.431e-25	2.884e-25
0.6616	2.548e+11	1.407e+03	6.788e+03	2.728e+00	1.316e+01
0.6938	2.306e+05	1.433e-03	6.746e-03	2.766e-06	1.302e-05
1.1732	1.413e+09	3.123e+01	1.090e+02	5.581e-02	1.947e-01
1.3325	1.413e+09	4.195e+01	1.358e+02	7.279e-02	2.356e-01
Totals	2.812e+11	1.481e+03	7.033e+03	2.857e+00	1.359e+01

Results - Dose Point # 2 - (149.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.700e-260	3.488e-26	1.165e-260	2.391e-26
0.0318	5.862e+09	6.213e-33	5.413e-25	5.175e-35	4.508e-27
0.0322	1.082e+10	1.226e-31	1.015e-24	9.870e-34	8.166e-27
0.0364	3.936e+09	3.729e-23	4.414e-23	2.119e-25	2.508e-25
0.6616	2.548e+11	1.062e+03	5.117e+03	2.059e+00	9.919e+00
0.6938	2.306e+05	1.081e-03	5.084e-03	2.088e-06	9.816e-06
1.1732	1.413e+09	2.354e+01	8.190e+01	4.206e-02	1.464e-01
1.3325	1.413e+09	3.160e+01	1.020e+02	5.483e-02	1.769e-01
Totals	2.812e+11	1.117e+03	5.300e+03	2.156e+00	1.024e+01

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Duration : 00:00:24

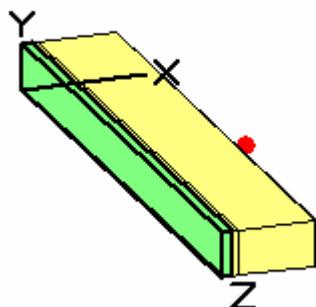
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Date :
By :
Checked :

Case Title: PM-2A V-13

Description: Dose at angle of 45 degrees on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	289.56 cm 9 ft 6.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	379.73 cm 12 ft 5.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	8.0 in.	Water	0.8
Shield 2	93.0 in.	Air	0.00122
Shield 3	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results – Dose Point # 1 – (114,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.011e-260	9.193e-26	1.378e-260	6.301e-26
0.0318	5.862e+09	6.882e-33	5.067e-23	5.732e-35	4.220e-25
0.0322	1.082e+10	1.362e-31	1.016e-22	1.097e-33	8.180e-25
0.0364	3.936e+09	4.278e-23	6.145e-21	2.431e-25	3.491e-23
0.6616	2.548e+11	1.407e+03	1.130e+04	2.728e+00	2.191e+01
0.6938	2.306e+05	1.433e-03	1.091e-02	2.766e-06	2.106e-05
1.1732	1.413e+09	3.123e+01	1.401e+02	5.581e-02	2.504e-01
1.3325	1.413e+09	4.195e+01	1.685e+02	7.279e-02	2.924e-01
Totals	2.812e+11	1.481e+03	1.161e+04	2.857e+00	2.245e+01

Results – Dose Point # 2 – (149.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.700e-260	6.431e-26	1.165e-260	4.408e-26
0.0318	5.862e+09	6.213e-33	3.544e-23	5.175e-35	2.952e-25
0.0322	1.082e+10	1.226e-31	7.111e-23	9.870e-34	5.722e-25
0.0364	3.936e+09	3.729e-23	5.332e-21	2.119e-25	3.029e-23
0.6616	2.548e+11	1.062e+03	8.513e+03	2.059e+00	1.650e+01
0.6938	2.306e+05	1.081e-03	8.217e-03	2.088e-06	1.587e-05
1.1732	1.413e+09	2.354e+01	1.053e+02	4.206e-02	1.881e-01
1.3325	1.413e+09	3.160e+01	1.265e+02	5.483e-02	2.194e-01
Totals	2.812e+11	1.117e+03	8.745e+03	2.156e+00	1.691e+01

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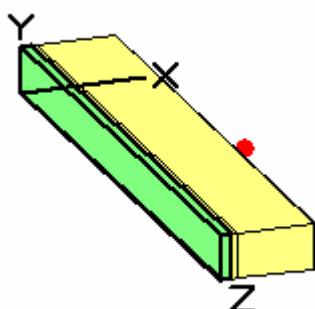
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By :
Checked :

Case Title: PM-2A V-13

Description: Dose at angle of 45 degrees on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	289.56 cm 9 ft 6.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	379.73 cm 12 ft 5.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	8.0 in.	Water	0.8
Shield 2	93.0 in.	Air	0.00122
Shield 3	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (114,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.011e-260	5.479e-26	1.378e-260	3.756e-26
0.0318	5.862e+09	6.882e-33	1.528e-24	5.732e-35	1.273e-26
0.0322	1.082e+10	1.362e-31	2.930e-24	1.097e-33	2.358e-26
0.0364	3.936e+09	4.278e-23	1.359e-22	2.431e-25	7.722e-25
0.6616	2.548e+11	1.407e+03	8.952e+03	2.728e+00	1.735e+01
0.6938	2.306e+05	1.433e-03	8.754e-03	2.766e-06	1.690e-05
1.1732	1.413e+09	3.123e+01	1.246e+02	5.581e-02	2.226e-01
1.3325	1.413e+09	4.195e+01	1.522e+02	7.279e-02	2.641e-01
Totals	2.812e+11	1.481e+03	9.229e+03	2.857e+00	1.784e+01

Results – Dose Point # 2 – (149.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.700e-260	3.833e-26	1.165e-260	2.627e-26
0.0318	5.862e+09	6.213e-33	1.069e-24	5.175e-35	8.906e-27
0.0322	1.082e+10	1.226e-31	2.050e-24	9.870e-34	1.650e-26
0.0364	3.936e+09	3.729e-23	1.182e-22	2.119e-25	6.718e-25
0.6616	2.548e+11	1.062e+03	6.746e+03	2.059e+00	1.308e+01
0.6938	2.306e+05	1.081e-03	6.595e-03	2.088e-06	1.273e-05
1.1732	1.413e+09	2.354e+01	9.359e+01	4.206e-02	1.673e-01
1.3325	1.413e+09	3.160e+01	1.143e+02	5.483e-02	1.983e-01
Totals	2.812e+11	1.117e+03	6.954e+03	2.156e+00	1.344e+01

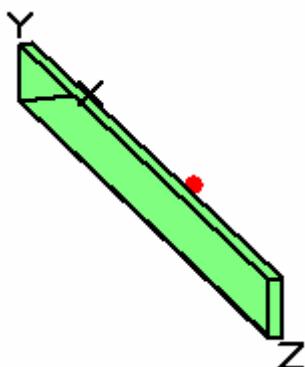
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	33.02 cm 1 ft 1.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	123.19 cm 4 ft 0.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (13,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.470e-260	5.436e-25	1.008e-260	3.726e-25
0.0318	5.862e+09	6.403e-31	8.435e-24	5.333e-33	7.026e-26
0.0322	1.082e+10	1.266e-29	1.581e-23	1.019e-31	1.273e-25
0.0364	3.936e+09	3.701e-21	4.337e-21	2.103e-23	2.464e-23
0.6616	2.548e+11	2.792e+04	8.992e+04	5.412e+01	1.743e+02
0.6938	2.306e+05	2.771e-02	8.786e-02	5.350e-05	1.696e-04
1.1732	1.413e+09	4.677e+02	1.217e+03	8.358e-01	2.175e+00
1.3325	1.413e+09	5.949e+02	1.472e+03	1.032e+00	2.554e+00
Totals	2.812e+11	2.898e+04	9.261e+04	5.599e+01	1.790e+02

Results - Dose Point # 2 - (48.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.890e-249	1.387e-25	2.667e-249	9.505e-26
0.0318	5.862e+09	1.423e-30	2.152e-24	1.185e-32	1.793e-26
0.0322	1.082e+10	2.613e-29	4.034e-24	2.103e-31	3.247e-26
0.0364	3.936e+09	4.390e-21	5.133e-21	2.494e-23	2.916e-23
0.6616	2.548e+11	1.704e+04	4.932e+04	3.303e+01	9.560e+01
0.6938	2.306e+05	1.682e-02	4.788e-02	3.247e-05	9.244e-05
1.1732	1.413e+09	2.657e+02	6.184e+02	4.748e-01	1.105e+00
1.3325	1.413e+09	3.323e+02	7.358e+02	5.764e-01	1.277e+00
Totals	2.812e+11	1.763e+04	5.067e+04	3.408e+01	9.799e+01

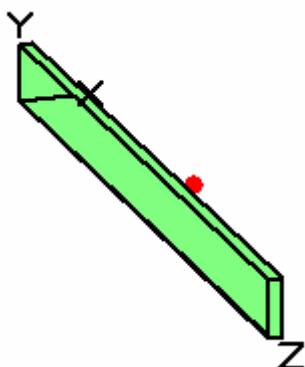
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	140.132 cm	(4 ft 7.2 in.)



Dose Points

A	X	Y	Z
# 1	33.02 cm 1 ft 1.0 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.
# 2	123.19 cm 4 ft 0.5 in.	70.104 cm 2 ft 3.6 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in. ³	Concrete	1.2
Shield 1	.5 in.	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results – Dose Point # 1 – (13,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.470e-260	1.002e-24	1.008e-260	6.870e-25
0.0318	5.862e+09	6.403e-31	5.524e-22	5.333e-33	4.601e-24
0.0322	1.082e+10	1.266e-29	1.108e-21	1.019e-31	8.918e-24
0.0364	3.936e+09	3.701e-21	4.845e-19	2.103e-23	2.752e-21
0.6616	2.548e+11	2.792e+04	1.325e+05	5.412e+01	2.568e+02
0.6938	2.306e+05	2.771e-02	1.267e-01	5.350e-05	2.446e-04
1.1732	1.413e+09	4.677e+02	1.485e+03	8.358e-01	2.653e+00
1.3325	1.413e+09	5.949e+02	1.749e+03	1.032e+00	3.034e+00
Totals	2.812e+11	2.898e+04	1.357e+05	5.599e+01	2.625e+02

Results - Dose Point # 2 - (48.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.890e-249	2.557e-25	2.667e-249	1.753e-25
0.0318	5.862e+09	1.423e-30	1.409e-22	1.185e-32	1.174e-24
0.0322	1.082e+10	2.613e-29	2.827e-22	2.103e-31	2.275e-24
0.0364	3.936e+09	4.390e-21	5.563e-19	2.494e-23	3.161e-21
0.6616	2.548e+11	1.704e+04	6.950e+04	3.303e+01	1.347e+02
0.6938	2.306e+05	1.682e-02	6.616e-02	3.247e-05	1.277e-04
1.1732	1.413e+09	2.657e+02	7.355e+02	4.748e-01	1.314e+00
1.3325	1.413e+09	3.323e+02	8.544e+02	5.764e-01	1.482e+00
Totals	2.812e+11	1.763e+04	7.109e+04	3.408e+01	1.375e+02

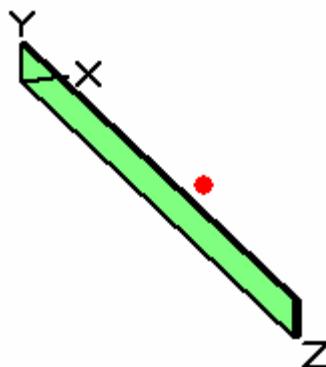
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in.)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	82.245 cm	(2 ft 8.4 in.)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in.	41.148 cm 1 ft 4.2 in.	838.2 cm 27 ft 6.0 in.
# 2	104.14 cm 3 ft 5.0 in.	41.148 cm 1 ft 4.2 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in. ³	Concrete	1.2
Shield 1	.5 in.	Iron	7.86
Shield 2	.5 in.	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is – Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.964e-25	0.000e+00	2.032e-25
0.0318	1.819e+09	4.894e-187	4.600e-24	4.077e-189	3.832e-26
0.0322	3.356e+09	6.111e-181	8.623e-24	4.918e-183	6.940e-26
0.0364	1.221e+09	2.089e-130	3.780e-24	1.187e-132	2.147e-26
0.6616	7.905e+10	3.877e+03	1.935e+04	7.517e+00	3.751e+01
0.6938	6.880e+04	4.060e-03	1.947e-02	7.839e-06	3.759e-05
1.1732	4.218e+08	1.269e+02	4.157e+02	2.268e-01	7.429e-01
1.3325	4.218e+08	1.735e+02	5.266e+02	3.010e-01	9.135e-01
Totals	8.720e+10	4.178e+03	2.029e+04	8.045e+00	3.917e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	4.881e-26	0.000e+00	3.345e-26
0.0318	1.819e+09	2.527e-186	7.574e-25	2.105e-188	6.309e-27
0.0322	3.356e+09	2.796e-180	1.420e-24	2.250e-182	1.143e-26
0.0364	1.221e+09	3.635e-130	6.223e-25	2.065e-132	3.536e-27
0.6616	7.905e+10	2.044e+03	9.097e+03	3.963e+00	1.764e+01
0.6938	6.880e+04	2.109e-03	8.999e-03	4.072e-06	1.737e-05
1.1732	4.218e+08	5.737e+01	1.652e+02	1.025e-01	2.952e-01
1.3325	4.218e+08	7.628e+01	2.035e+02	1.323e-01	3.530e-01
Totals	8.720e+10	2.178e+03	9.466e+03	4.197e+00	1.828e+01

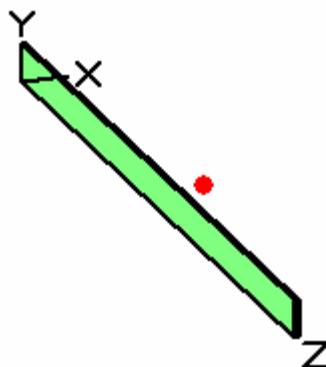
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in.)
Width	1.7e+3 cm	(55 ft 0.0 in.)
Height	82.245 cm	(2 ft 8.4 in.)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in.	41.148 cm 1 ft 4.2 in.	838.2 cm 27 ft 6.0 in.
# 2	104.14 cm 3 ft 5.0 in.	41.148 cm 1 ft 4.2 in.	838.2 cm 27 ft 6.0 in.

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in. ³	Concrete	1.2
Shield 1	.5 in.	Iron	7.86
Shield 2	.5 in.	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.935e-25	0.000e+00	2.012e-25
0.0318	1.819e+09	4.894e-187	4.306e-24	4.077e-189	3.587e-26
0.0322	3.356e+09	6.111e-181	8.047e-24	4.918e-183	6.476e-26
0.0364	1.221e+09	2.089e-130	3.350e-24	1.187e-132	1.903e-26
0.6616	7.905e+10	3.877e+03	6.760e+03	7.517e+00	1.311e+01
0.6938	6.880e+04	4.060e-03	7.151e-03	7.839e-06	1.381e-05
1.1732	4.218e+08	1.269e+02	2.340e+02	2.268e-01	4.181e-01
1.3325	4.218e+08	1.735e+02	3.161e+02	3.010e-01	5.485e-01
Totals	8.720e+10	4.178e+03	7.311e+03	8.045e+00	1.407e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	4.832e-26	0.000e+00	3.312e-26
0.0318	1.819e+09	2.527e-186	7.090e-25	2.105e-188	5.906e-27
0.0322	3.356e+09	2.796e-180	1.325e-24	2.250e-182	1.066e-26
0.0364	1.221e+09	3.635e-130	5.516e-25	2.065e-132	3.134e-27
0.6616	7.905e+10	2.044e+03	3.456e+03	3.963e+00	6.699e+00
0.6938	6.880e+04	2.109e-03	3.594e-03	4.072e-06	6.939e-06
1.1732	4.218e+08	5.737e+01	9.970e+01	1.025e-01	1.782e-01
1.3325	4.218e+08	7.628e+01	1.303e+02	1.323e-01	2.260e-01
Totals	8.720e+10	2.178e+03	3.686e+03	4.197e+00	7.104e+00

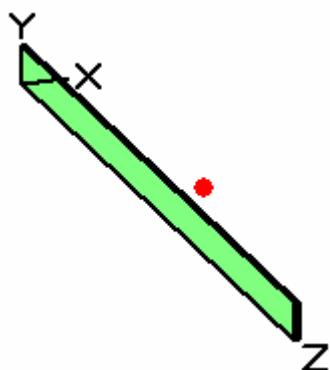
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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	5.466e-25	0.000e+00	3.746e-25
0.0318	1.819e+09	4.894e-187	3.012e-22	4.077e-189	2.509e-24
0.0322	3.356e+09	6.111e-181	6.043e-22	4.918e-183	4.863e-24
0.0364	1.221e+09	2.089e-130	5.358e-22	1.187e-132	3.044e-24
0.6616	7.905e+10	3.877e+03	3.253e+04	7.517e+00	6.306e+01
0.6938	6.880e+04	4.060e-03	3.165e-02	7.839e-06	6.111e-05
1.1732	4.218e+08	1.269e+02	5.288e+02	2.268e-01	9.450e-01
1.3325	4.218e+08	1.735e+02	6.469e+02	3.010e-01	1.122e+00
Totals	8.720e+10	4.178e+03	3.371e+04	8.045e+00	6.513e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	9.000e-26	0.000e+00	6.169e-26
0.0318	1.819e+09	2.527e-186	4.960e-23	2.105e-188	4.131e-25
0.0322	3.356e+09	2.796e-180	9.950e-23	2.250e-182	8.008e-25
0.0364	1.221e+09	3.635e-130	8.822e-23	2.065e-132	5.012e-25
0.6616	7.905e+10	2.044e+03	1.471e+04	3.963e+00	2.852e+01
0.6938	6.880e+04	2.109e-03	1.409e-02	4.072e-06	2.720e-05
1.1732	4.218e+08	5.737e+01	2.048e+02	1.025e-01	3.660e-01
1.3325	4.218e+08	7.628e+01	2.443e+02	1.323e-01	4.239e-01
Totals	8.720e+10	2.178e+03	1.516e+04	4.197e+00	2.931e+01

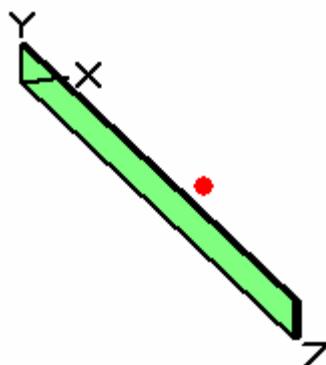
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.258e-25	0.000e+00	2.233e-25
0.0318	1.819e+09	4.894e-187	9.087e-24	4.077e-189	7.569e-26
0.0322	3.356e+09	6.111e-181	1.742e-23	4.918e-183	1.402e-25
0.0364	1.221e+09	2.089e-130	9.709e-24	1.187e-132	5.516e-26
0.6616	7.905e+10	3.877e+03	2.565e+04	7.517e+00	4.972e+01
0.6938	6.880e+04	4.060e-03	2.533e-02	7.839e-06	4.891e-05
1.1732	4.218e+08	1.269e+02	4.727e+02	2.268e-01	8.448e-01
1.3325	4.218e+08	1.735e+02	5.876e+02	3.010e-01	1.019e+00
Totals	8.720e+10	4.178e+03	2.671e+04	8.045e+00	5.159e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	5.364e-26	0.000e+00	3.677e-26
0.0318	1.819e+09	2.527e-186	1.496e-24	2.105e-188	1.246e-26
0.0322	3.356e+09	2.796e-180	2.869e-24	2.250e-182	2.309e-26
0.0364	1.221e+09	3.635e-130	1.599e-24	2.065e-132	9.083e-27
0.6616	7.905e+10	2.044e+03	1.182e+04	3.963e+00	2.291e+01
0.6938	6.880e+04	2.109e-03	1.148e-02	4.072e-06	2.217e-05
1.1732	4.218e+08	5.737e+01	1.855e+02	1.025e-01	3.315e-01
1.3325	4.218e+08	7.628e+01	2.246e+02	1.323e-01	3.897e-01
Totals	8.720e+10	2.178e+03	1.223e+04	4.197e+00	2.363e+01

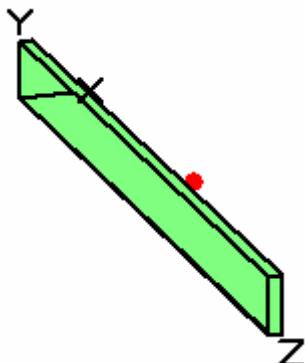
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)



Dose Points

A	X	Y	Z
# 1	33.02 cm 1 ft 1.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	123.19 cm 4 ft 0.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (13,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.470e-260	5.974e-25	1.008e-260	4.095e-25
0.0318	5.862e+09	6.403e-31	1.666e-23	5.333e-33	1.388e-25
0.0322	1.082e+10	1.266e-29	3.195e-23	1.019e-31	2.571e-25
0.0364	3.936e+09	3.701e-21	1.170e-20	2.103e-23	6.650e-23
0.6616	2.548e+11	2.792e+04	1.113e+05	5.412e+01	2.157e+02
0.6938	2.306e+05	2.771e-02	1.074e-01	5.350e-05	2.074e-04
1.1732	1.413e+09	4.677e+02	1.355e+03	8.358e-01	2.421e+00
1.3325	1.413e+09	5.949e+02	1.615e+03	1.032e+00	2.802e+00
Totals	2.812e+11	2.898e+04	1.142e+05	5.599e+01	2.209e+02

Results - Dose Point # 2 - (48.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.890e-249	1.524e-25	2.667e-249	1.045e-25
0.0318	5.862e+09	1.423e-30	4.251e-24	1.185e-32	3.541e-26
0.0322	1.082e+10	2.613e-29	8.151e-24	2.103e-31	6.560e-26
0.0364	3.936e+09	4.390e-21	1.386e-20	2.494e-23	7.876e-23
0.6616	2.548e+11	1.704e+04	5.966e+04	3.303e+01	1.157e+02
0.6938	2.306e+05	1.682e-02	5.728e-02	3.247e-05	1.106e-04
1.1732	1.413e+09	2.657e+02	6.796e+02	4.748e-01	1.214e+00
1.3325	1.413e+09	3.323e+02	7.979e+02	5.764e-01	1.384e+00
Totals	2.812e+11	1.763e+04	6.114e+04	3.408e+01	1.183e+02

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DOS File :v13_endoftank.ms6
Run Date : March 3, 2004
Run Time : 8:28:56 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1769.11 cm 58 ft 0.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.175e-259	3.262e-25	2.176e-259	2.236e-25
0.0318	5.862e+09	5.367e-31	5.062e-24	4.471e-33	4.217e-26
0.0322	1.082e+10	1.059e-29	9.490e-24	8.524e-32	7.637e-26
0.0364	3.936e+09	3.139e-21	3.677e-21	1.783e-23	2.089e-23
0.6616	2.548e+11	2.609e+04	7.966e+04	5.058e+01	1.544e+02
0.6938	2.306e+05	2.583e-02	7.756e-02	4.986e-05	1.497e-04
1.1732	1.413e+09	4.213e+02	1.033e+03	7.529e-01	1.845e+00
1.3325	1.413e+09	5.309e+02	1.238e+03	9.211e-01	2.147e+00
Totals	2.812e+11	2.704e+04	8.193e+04	5.225e+01	1.584e+02

Results - Dose Point # 2 - (696.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.329e-249	5.307e-26	1.596e-249	3.637e-26
0.0318	5.862e+09	1.169e-30	8.235e-25	9.734e-33	6.860e-27
0.0322	1.082e+10	2.127e-29	1.544e-24	1.712e-31	1.242e-26
0.0364	3.936e+09	3.221e-21	3.764e-21	1.830e-23	2.139e-23
0.6616	2.548e+11	3.119e+03	8.465e+03	6.047e+00	1.641e+01
0.6938	2.306e+05	3.068e-03	8.207e-03	5.924e-06	1.585e-05
1.1732	1.413e+09	4.691e+01	1.056e+02	8.384e-02	1.887e-01
1.3325	1.413e+09	5.835e+01	1.259e+02	1.012e-01	2.184e-01
Totals	2.812e+11	3.225e+03	8.697e+03	6.232e+00	1.682e+01

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Run Date : March 3, 2004
Run Time : 8:29:24 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1769.11 cm 58 ft 0.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.175e-259	6.015e-25	2.176e-259	4.123e-25
0.0318	5.862e+09	5.367e-31	3.315e-22	4.471e-33	2.761e-24
0.0322	1.082e+10	1.059e-29	6.650e-22	8.524e-32	5.352e-24
0.0364	3.936e+09	3.139e-21	4.120e-19	1.783e-23	2.341e-21
0.6616	2.548e+11	2.609e+04	1.147e+05	5.058e+01	2.223e+02
0.6938	2.306e+05	2.583e-02	1.094e-01	4.986e-05	2.111e-04
1.1732	1.413e+09	4.213e+02	1.242e+03	7.529e-01	2.220e+00
1.3325	1.413e+09	5.309e+02	1.452e+03	9.211e-01	2.519e+00
Totals	2.812e+11	2.704e+04	1.174e+05	5.225e+01	2.270e+02

Results - Dose Point # 2 - (696.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.329e-249	9.785e-26	1.596e-249	6.707e-26
0.0318	5.862e+09	1.169e-30	5.393e-23	9.734e-33	4.492e-25
0.0322	1.082e+10	2.127e-29	1.082e-22	1.712e-31	8.707e-25
0.0364	3.936e+09	3.221e-21	4.044e-19	1.830e-23	2.298e-21
0.6616	2.548e+11	3.119e+03	1.170e+04	6.047e+00	2.268e+01
0.6938	2.306e+05	3.068e-03	1.114e-02	5.924e-06	2.151e-05
1.1732	1.413e+09	4.691e+01	1.249e+02	8.384e-02	2.232e-01
1.3325	1.413e+09	5.835e+01	1.456e+02	1.012e-01	2.527e-01
Totals	2.812e+11	3.225e+03	1.197e+04	6.232e+00	2.316e+01

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Run Date : March 3, 2004
Run Time : 8:29:50 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1770.38 cm 58 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	3.041e-25	0.000e+00	2.085e-25
0.0318	5.862e+09	2.531e-188	4.720e-24	2.108e-190	3.931e-26
0.0322	1.082e+10	3.378e-182	8.848e-24	2.718e-184	7.121e-26
0.0364	3.936e+09	2.131e-131	3.878e-24	1.211e-133	2.203e-26
0.6616	2.548e+11	3.316e+03	1.806e+04	6.428e+00	3.501e+01
0.6938	2.306e+05	3.624e-03	1.896e-02	6.996e-06	3.661e-05
1.1732	1.413e+09	1.186e+02	4.205e+02	2.120e-01	7.515e-01
1.3325	1.413e+09	1.643e+02	5.379e+02	2.851e-01	9.332e-01
Totals	2.812e+11	3.599e+03	1.902e+04	6.925e+00	3.670e+01

Results - Dose Point # 2 - (697,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	5.239e-26	0.000e+00	3.591e-26
0.0318	5.862e+09	1.593e-186	8.130e-25	1.327e-188	6.772e-27
0.0322	1.082e+10	1.762e-180	1.524e-24	1.418e-182	1.226e-26
0.0364	3.936e+09	2.278e-130	6.680e-25	1.294e-132	3.795e-27
0.6616	2.548e+11	6.186e+02	2.950e+03	1.199e+00	5.719e+00
0.6938	2.306e+05	6.628e-04	3.038e-03	1.280e-06	5.866e-06
1.1732	1.413e+09	1.837e+01	5.820e+01	3.283e-02	1.040e-01
1.3325	1.413e+09	2.475e+01	7.289e+01	4.294e-02	1.265e-01
Totals	2.812e+11	6.618e+02	3.081e+03	1.275e+00	5.949e+00

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Run Date : March 3, 2004
Run Time : 8:30:17 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1770.38 cm 58 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	3.011e-25	0.000e+00	2.064e-25
0.0318	5.862e+09	2.531e-188	4.418e-24	2.108e-190	3.680e-26
0.0322	1.082e+10	3.378e-182	8.257e-24	2.718e-184	6.645e-26
0.0364	3.936e+09	2.131e-131	3.437e-24	1.211e-133	1.953e-26
0.6616	2.548e+11	3.316e+03	5.923e+03	6.428e+00	1.148e+01
0.6938	2.306e+05	3.624e-03	6.547e-03	6.996e-06	1.264e-05
1.1732	1.413e+09	1.186e+02	2.271e+02	2.120e-01	4.059e-01
1.3325	1.413e+09	1.643e+02	3.115e+02	2.851e-01	5.404e-01
Totals	2.812e+11	3.599e+03	6.462e+03	6.925e+00	1.243e+01

Results - Dose Point # 2 - (697,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	5.187e-26	0.000e+00	3.555e-26
0.0318	5.862e+09	1.593e-186	7.610e-25	1.327e-188	6.339e-27
0.0322	1.082e+10	1.762e-180	1.422e-24	1.418e-182	1.145e-26
0.0364	3.936e+09	2.278e-130	5.921e-25	1.294e-132	3.364e-27
0.6616	2.548e+11	6.186e+02	1.063e+03	1.199e+00	2.062e+00
0.6938	2.306e+05	6.628e-04	1.150e-03	1.280e-06	2.221e-06
1.1732	1.413e+09	1.837e+01	3.328e+01	3.283e-02	5.948e-02
1.3325	1.413e+09	2.475e+01	4.434e+01	4.294e-02	7.692e-02
Totals	2.812e+11	6.618e+02	1.141e+03	1.275e+00	2.198e+00

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DOS File :v13_endoftank_pb_a.ms6
Run Date : March 3, 2004
Run Time : 8:30:44 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1770.38 cm 58 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	5.608e-25	0.000e+00	3.844e-25
0.0318	5.862e+09	2.531e-188	3.091e-22	2.108e-190	2.574e-24
0.0322	1.082e+10	3.378e-182	6.200e-22	2.718e-184	4.990e-24
0.0364	3.936e+09	2.131e-131	5.497e-22	1.211e-133	3.123e-24
0.6616	2.548e+11	3.316e+03	3.120e+04	6.428e+00	6.049e+01
0.6938	2.306e+05	3.624e-03	3.163e-02	6.996e-06	6.108e-05
1.1732	1.413e+09	1.186e+02	5.425e+02	2.120e-01	9.694e-01
1.3325	1.413e+09	1.643e+02	6.689e+02	2.851e-01	1.160e+00
Totals	2.812e+11	3.599e+03	3.241e+04	6.925e+00	6.262e+01

Results - Dose Point # 2 - (697,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	9.659e-26	0.000e+00	6.621e-26
0.0318	5.862e+09	1.593e-186	5.324e-23	1.327e-188	4.434e-25
0.0322	1.082e+10	1.762e-180	1.068e-22	1.418e-182	8.595e-25
0.0364	3.936e+09	2.278e-130	9.469e-23	1.294e-132	5.380e-25
0.6616	2.548e+11	6.186e+02	4.897e+03	1.199e+00	9.493e+00
0.6938	2.306e+05	6.628e-04	4.880e-03	1.280e-06	9.422e-06
1.1732	1.413e+09	1.837e+01	7.360e+01	3.283e-02	1.315e-01
1.3325	1.413e+09	2.475e+01	8.912e+01	4.294e-02	1.546e-01
Totals	2.812e+11	6.618e+02	5.060e+03	1.275e+00	9.779e+00

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DOS File :v13_endoftank_pb_s.ms6
Run Date : March 3, 2004
Run Time : 8:31:11 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1770.38 cm 58 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	3.342e-25	0.000e+00	2.291e-25
0.0318	5.862e+09	2.531e-188	9.323e-24	2.108e-190	7.766e-26
0.0322	1.082e+10	3.378e-182	1.788e-23	2.718e-184	1.439e-25
0.0364	3.936e+09	2.131e-131	9.962e-24	1.211e-133	5.660e-26
0.6616	2.548e+11	3.316e+03	2.428e+04	6.428e+00	4.707e+01
0.6938	2.306e+05	3.624e-03	2.500e-02	6.996e-06	4.828e-05
1.1732	1.413e+09	1.186e+02	4.815e+02	2.120e-01	8.604e-01
1.3325	1.413e+09	1.643e+02	6.037e+02	2.851e-01	1.047e+00
Totals	2.812e+11	3.599e+03	2.537e+04	6.925e+00	4.898e+01

Results - Dose Point # 2 - (697,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	5.757e-26	0.000e+00	3.946e-26
0.0318	5.862e+09	1.593e-186	1.606e-24	1.327e-188	1.338e-26
0.0322	1.082e+10	1.762e-180	3.079e-24	1.418e-182	2.478e-26
0.0364	3.936e+09	2.278e-130	1.716e-24	1.294e-132	9.749e-27
0.6616	2.548e+11	6.186e+02	3.884e+03	1.199e+00	7.531e+00
0.6938	2.306e+05	6.628e-04	3.929e-03	1.280e-06	7.585e-06
1.1732	1.413e+09	1.837e+01	6.600e+01	3.283e-02	1.179e-01
1.3325	1.413e+09	2.475e+01	8.116e+01	4.294e-02	1.408e-01
Totals	2.812e+11	6.618e+02	4.032e+03	1.275e+00	7.789e+00

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DOS File :v13_endoftank_s.ms6
Run Date : March 3, 2004
Run Time : 8:31:37 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	140.132 cm	(4 ft 7.2 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in
# 2	1769.11 cm 58 ft 0.5 in	15.24 cm 6.0 in	70.104 cm 2 ft 3.6 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.175e-259	3.585e-25	2.176e-259	2.457e-25
0.0318	5.862e+09	5.367e-31	1.000e-23	4.471e-33	8.329e-26
0.0322	1.082e+10	1.059e-29	1.917e-23	8.524e-32	1.543e-25
0.0364	3.936e+09	3.139e-21	9.919e-21	1.783e-23	5.636e-23
0.6616	2.548e+11	2.609e+04	9.742e+04	5.058e+01	1.889e+02
0.6938	2.306e+05	2.583e-02	9.375e-02	4.986e-05	1.810e-04
1.1732	1.413e+09	4.213e+02	1.142e+03	7.529e-01	2.040e+00
1.3325	1.413e+09	5.309e+02	1.349e+03	9.211e-01	2.341e+00
Totals	2.812e+11	2.704e+04	9.991e+04	5.225e+01	1.932e+02

Results - Dose Point # 2 - (696.5,6,27.6) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	2.329e-249	5.832e-26	1.596e-249	3.998e-26
0.0318	5.862e+09	1.169e-30	1.627e-24	9.734e-33	1.355e-26
0.0322	1.082e+10	2.127e-29	3.119e-24	1.712e-31	2.510e-26
0.0364	3.936e+09	3.221e-21	1.017e-20	1.830e-23	5.778e-23
0.6616	2.548e+11	3.119e+03	1.013e+04	6.047e+00	1.964e+01
0.6938	2.306e+05	3.068e-03	9.722e-03	5.924e-06	1.877e-05
1.1732	1.413e+09	4.691e+01	1.156e+02	8.384e-02	2.067e-01
1.3325	1.413e+09	5.835e+01	1.362e+02	1.012e-01	2.363e-01
Totals	2.812e+11	3.225e+03	1.038e+04	6.232e+00	2.008e+01

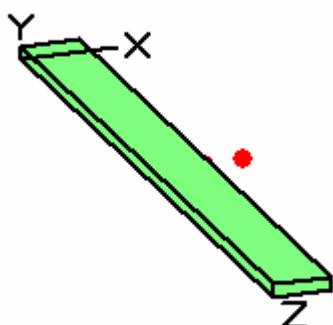
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Run Date : March 3, 2004
Run Time : 8:32:04 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose horizontal from waste in tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.499e-252	4.011e-25	2.398e-252	2.749e-25
0.0318	5.862e+09	1.688e-30	6.225e-24	1.406e-32	5.185e-26
0.0322	1.082e+10	3.111e-29	1.167e-23	2.504e-31	9.391e-26
0.0364	3.936e+09	5.232e-21	6.120e-21	2.973e-23	3.477e-23
0.6616	2.548e+11	2.610e+04	7.971e+04	5.060e+01	1.545e+02
0.6938	2.306e+05	2.584e-02	7.761e-02	4.989e-05	1.498e-04
1.1732	1.413e+09	4.216e+02	1.034e+03	7.534e-01	1.848e+00
1.3325	1.413e+09	5.314e+02	1.240e+03	9.219e-01	2.152e+00
Totals	2.812e+11	2.705e+04	8.199e+04	5.228e+01	1.585e+02

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	4.462e-250	1.007e-25	3.058e-250	6.900e-26
0.0318	5.862e+09	1.168e-30	1.562e-24	9.729e-33	1.301e-26
0.0322	1.082e+10	2.126e-29	2.928e-24	1.711e-31	2.357e-26
0.0364	3.936e+09	3.221e-21	3.765e-21	1.830e-23	2.139e-23
0.6616	2.548e+11	4.551e+03	1.338e+04	8.823e+00	2.593e+01
0.6938	2.306e+05	4.494e-03	1.302e-02	8.677e-06	2.514e-05
1.1732	1.413e+09	7.197e+01	1.753e+02	1.286e-01	3.133e-01
1.3325	1.413e+09	9.058e+01	2.113e+02	1.571e-01	3.666e-01
Totals	2.812e+11	4.714e+03	1.376e+04	9.109e+00	2.661e+01

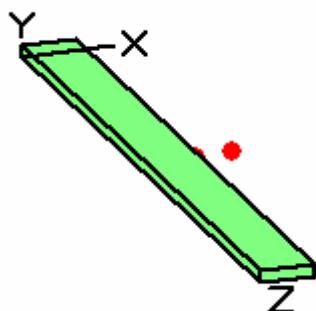
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DOS File :v13_horizontal_a.ms6
Run Date : March 3, 2004
Run Time : 8:32:29 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose horizontal from waste in tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	3.499e-252	7.396e-25	2.398e-252	5.070e-25
0.0318	5.862e+09	1.688e-30	4.076e-22	1.406e-32	3.395e-24
0.0322	1.082e+10	3.111e-29	8.178e-22	2.504e-31	6.581e-24
0.0364	3.936e+09	5.232e-21	6.617e-19	2.973e-23	3.759e-21
0.6616	2.548e+11	2.610e+04	1.147e+05	5.060e+01	2.224e+02
0.6938	2.306e+05	2.584e-02	1.094e-01	4.989e-05	2.113e-04
1.1732	1.413e+09	4.216e+02	1.245e+03	7.534e-01	2.225e+00
1.3325	1.413e+09	5.314e+02	1.456e+03	9.219e-01	2.525e+00
Totals	2.812e+11	2.705e+04	1.174e+05	5.228e+01	2.272e+02

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	4.462e-250	1.856e-25	3.058e-250	1.272e-25
0.0318	5.862e+09	1.168e-30	1.023e-22	9.729e-33	8.521e-25
0.0322	1.082e+10	2.126e-29	2.052e-22	1.711e-31	1.652e-24
0.0364	3.936e+09	3.221e-21	4.045e-19	1.830e-23	2.298e-21
0.6616	2.548e+11	4.551e+03	1.910e+04	8.823e+00	3.703e+01
0.6938	2.306e+05	4.494e-03	1.824e-02	8.677e-06	3.521e-05
1.1732	1.413e+09	7.197e+01	2.112e+02	1.286e-01	3.774e-01
1.3325	1.413e+09	9.058e+01	2.484e+02	1.571e-01	4.309e-01
Totals	2.812e+11	4.714e+03	1.956e+04	9.109e+00	3.784e+01

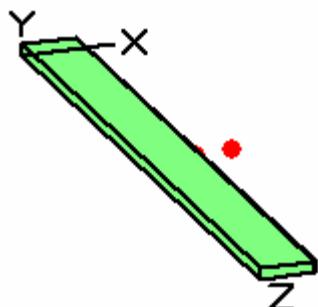
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Run Date : March 3, 2004
Run Time : 8:32:55 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose horizontal from waste in tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	4.011e-25	0.000e+00	2.749e-25
0.0318	5.862e+09	2.627e-187	6.225e-24	2.188e-189	5.185e-26
0.0322	1.082e+10	3.237e-181	1.167e-23	2.605e-183	9.391e-26
0.0364	3.936e+09	1.004e-130	5.115e-24	5.705e-133	2.906e-26
0.6616	2.548e+11	3.357e+03	1.839e+04	6.509e+00	3.565e+01
0.6938	2.306e+05	3.671e-03	1.933e-02	7.088e-06	3.731e-05
1.1732	1.413e+09	1.211e+02	4.327e+02	2.164e-01	7.732e-01
1.3325	1.413e+09	1.680e+02	5.547e+02	2.914e-01	9.623e-01
Totals	2.812e+11	3.646e+03	1.938e+04	7.016e+00	3.739e+01

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	1.007e-25	0.000e+00	6.900e-26
0.0318	5.862e+09	1.592e-186	1.562e-24	1.326e-188	1.301e-26
0.0322	1.082e+10	1.761e-180	2.928e-24	1.418e-182	2.357e-26
0.0364	3.936e+09	2.281e-130	1.284e-24	1.296e-132	7.293e-27
0.6616	2.548e+11	7.779e+02	3.961e+03	1.508e+00	7.679e+00
0.6938	2.306e+05	8.402e-04	4.119e-03	1.622e-06	7.953e-06
1.1732	1.413e+09	2.522e+01	8.616e+01	4.507e-02	1.540e-01
1.3325	1.413e+09	3.454e+01	1.098e+02	5.993e-02	1.905e-01
Totals	2.812e+11	8.376e+02	4.157e+03	1.613e+00	8.023e+00

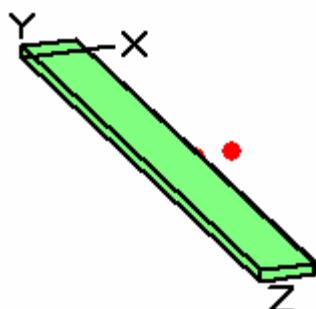
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Run Date : March 3, 2004
Run Time : 8:33:21 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-13
Description: Dose horizontal from waste in tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	3.971e-25	0.000e+00	2.722e-25
0.0318	5.862e+09	2.627e-187	5.827e-24	2.188e-189	4.854e-26
0.0322	1.082e+10	3.237e-181	1.089e-23	2.605e-183	8.764e-26
0.0364	3.936e+09	1.004e-130	4.534e-24	5.705e-133	2.576e-26
0.6616	2.548e+11	3.357e+03	6.006e+03	6.509e+00	1.164e+01
0.6938	2.306e+05	3.671e-03	6.643e-03	7.088e-06	1.283e-05
1.1732	1.413e+09	1.211e+02	2.327e+02	2.164e-01	4.158e-01
1.3325	1.413e+09	1.680e+02	3.198e+02	2.914e-01	5.549e-01
Totals	2.812e+11	3.646e+03	6.558e+03	7.016e+00	1.261e+01

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	9.967e-26	0.000e+00	6.831e-26
0.0318	5.862e+09	1.592e-186	1.462e-24	1.326e-188	1.218e-26
0.0322	1.082e+10	1.761e-180	2.733e-24	1.418e-182	2.199e-26
0.0364	3.936e+09	2.281e-130	1.138e-24	1.296e-132	6.464e-27
0.6616	2.548e+11	7.779e+02	1.361e+03	1.508e+00	2.638e+00
0.6938	2.306e+05	8.402e-04	1.486e-03	1.622e-06	2.868e-06
1.1732	1.413e+09	2.522e+01	4.730e+01	4.507e-02	8.452e-02
1.3325	1.413e+09	3.454e+01	6.430e+01	5.993e-02	1.116e-01
Totals	2.812e+11	8.376e+02	1.472e+03	1.613e+00	2.834e+00

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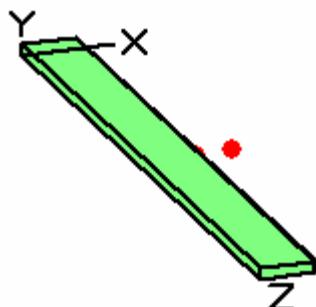
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Case Title: PM-2A V-13

Description: Dose horizontal from waste in tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	7.396e-25	0.000e+00	5.070e-25
0.0318	5.862e+09	2.627e-187	4.076e-22	2.188e-189	3.395e-24
0.0322	1.082e+10	3.237e-181	8.178e-22	2.605e-183	6.581e-24
0.0364	3.936e+09	1.004e-130	7.250e-22	5.705e-133	4.119e-24
0.6616	2.548e+11	3.357e+03	3.183e+04	6.509e+00	6.171e+01
0.6938	2.306e+05	3.671e-03	3.230e-02	7.088e-06	6.236e-05
1.1732	1.413e+09	1.211e+02	5.590e+02	2.164e-01	9.989e-01
1.3325	1.413e+09	1.680e+02	6.906e+02	2.914e-01	1.198e+00
Totals	2.812e+11	3.646e+03	3.308e+04	7.016e+00	6.391e+01

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	1.856e-25	0.000e+00	1.272e-25
0.0318	5.862e+09	1.592e-186	1.023e-22	1.326e-188	8.521e-25
0.0322	1.082e+10	1.761e-180	2.052e-22	1.418e-182	1.652e-24
0.0364	3.936e+09	2.281e-130	1.819e-22	1.296e-132	1.034e-24
0.6616	2.548e+11	7.779e+02	6.721e+03	1.508e+00	1.303e+01
0.6938	2.306e+05	8.402e-04	6.759e-03	1.622e-06	1.305e-05
1.1732	1.413e+09	2.522e+01	1.105e+02	4.507e-02	1.975e-01
1.3325	1.413e+09	3.454e+01	1.359e+02	5.993e-02	2.358e-01
Totals	2.812e+11	8.376e+02	6.968e+03	1.613e+00	1.346e+01

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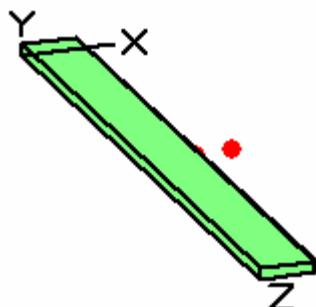
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By :
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Case Title: PM-2A V-13

Description: Dose horizontal from waste in tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	1.4285e+001	5.2853e+011	1.9950e+000	7.3814e+004
Co-60	7.1400e-002	2.6418e+009	9.9717e-003	3.6895e+002
Cs-137	1.5100e+001	5.5870e+011	2.1089e+000	7.8028e+004
Sr-90	1.6000e+001	5.9200e+011	2.2346e+000	8.2678e+004
Y-90	1.6000e+001	5.9200e+011	2.2346e+000	8.2678e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	1.094e+10	4.904e-187	2.295e-23	4.085e-189	1.912e-25
0.0322	2.019e+10	6.041e-181	4.400e-23	4.862e-183	3.541e-25
0.0364	7.347e+09	1.874e-130	2.452e-23	1.065e-132	1.393e-25
0.6616	4.756e+11	6.266e+03	4.619e+04	1.215e+01	8.955e+01
0.6938	4.309e+05	6.862e-03	4.768e-02	1.325e-05	9.205e-05
1.1732	2.642e+09	2.263e+02	9.267e+02	4.044e-01	1.656e+00
1.3325	2.642e+09	3.140e+02	1.164e+03	5.447e-01	2.020e+00
Totals	5.193e+11	6.807e+03	4.828e+04	1.310e+01	9.322e+01

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	1.094e+10	2.972e-186	5.760e-24	2.475e-188	4.798e-26
0.0322	2.019e+10	3.288e-180	1.104e-23	2.646e-182	8.887e-26
0.0364	7.347e+09	4.258e-130	6.154e-24	2.419e-132	3.497e-26
0.6616	4.756e+11	1.452e+03	9.846e+03	2.815e+00	1.909e+01
0.6938	4.309e+05	1.570e-03	1.007e-02	3.032e-06	1.943e-05
1.1732	2.642e+09	4.714e+01	1.839e+02	8.424e-02	3.286e-01
1.3325	2.642e+09	6.457e+01	2.299e+02	1.120e-01	3.988e-01
Totals	5.193e+11	1.564e+03	1.026e+04	3.011e+00	1.982e+01

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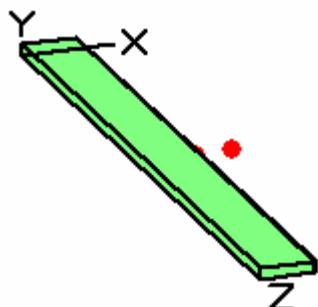
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By :
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Case Title: PM-2A V-13

Description: Dose horizontal from waste in tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	140.132 cm	(4 ft 7.2 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	30.48 cm	(1 ft)



Dose Points

A	X	Y	Z
# 1	142.6718 cm 4 ft 8.2 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in
# 2	232.8418 cm 7 ft 7.7 in	15.24 cm 6.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (56.17,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	4.408e-25	0.000e+00	3.022e-25
0.0318	5.862e+09	2.627e-187	1.230e-23	2.188e-189	1.024e-25
0.0322	1.082e+10	3.237e-181	2.358e-23	2.605e-183	1.897e-25
0.0364	3.936e+09	1.004e-130	1.314e-23	5.705e-133	7.465e-26
0.6616	2.548e+11	3.357e+03	2.475e+04	6.509e+00	4.798e+01
0.6938	2.306e+05	3.671e-03	2.551e-02	7.088e-06	4.925e-05
1.1732	1.413e+09	1.211e+02	4.958e+02	2.164e-01	8.860e-01
1.3325	1.413e+09	1.680e+02	6.229e+02	2.914e-01	1.081e+00
Totals	2.812e+11	3.646e+03	2.587e+04	7.016e+00	4.994e+01

Results - Dose Point # 2 - (91.67,6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	0.000e+00	1.106e-25	0.000e+00	7.583e-26
0.0318	5.862e+09	1.592e-186	3.086e-24	1.326e-188	2.570e-26
0.0322	1.082e+10	1.761e-180	5.916e-24	1.418e-182	4.762e-26
0.0364	3.936e+09	2.281e-130	3.297e-24	1.296e-132	1.873e-26
0.6616	2.548e+11	7.779e+02	5.275e+03	1.508e+00	1.023e+01
0.6938	2.306e+05	8.402e-04	5.385e-03	1.622e-06	1.040e-05
1.1732	1.413e+09	2.522e+01	9.839e+01	4.507e-02	1.758e-01
1.3325	1.413e+09	3.454e+01	1.230e+02	5.993e-02	2.134e-01
Totals	2.812e+11	8.376e+02	5.497e+03	1.613e+00	1.062e+01

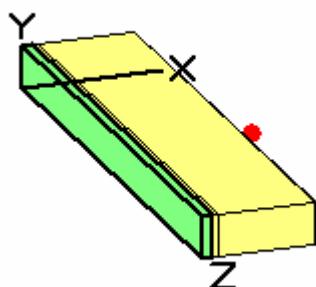
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File Ref :
Date :
By :
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Case Title: PM-2A V-13
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	129.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.692e-260	6.682e-26	1.160e-260	4.580e-26
0.0318	5.862e+09	6.191e-33	4.673e-23	5.157e-35	3.892e-25
0.0322	1.082e+10	1.222e-31	9.452e-23	9.836e-34	7.607e-25
0.0364	3.936e+09	3.713e-23	7.262e-21	2.110e-25	4.126e-23
0.6616	2.548e+11	1.055e+03	8.598e+03	2.045e+00	1.667e+01
0.6938	2.306e+05	1.074e-03	8.288e-03	2.073e-06	1.600e-05
1.1732	1.413e+09	2.337e+01	1.051e+02	4.177e-02	1.878e-01
1.3325	1.413e+09	3.138e+01	1.261e+02	5.444e-02	2.187e-01
Totals	2.812e+11	1.110e+03	8.829e+03	2.141e+00	1.707e+01

Results - Dose Point # 2 - (186,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.430e-260	4.975e-26	9.800e-261	3.410e-26
0.0318	5.862e+09	5.424e-33	3.479e-23	4.518e-35	2.898e-25
0.0322	1.082e+10	1.068e-31	7.036e-23	8.598e-34	5.663e-25
0.0364	3.936e+09	3.176e-23	6.193e-21	1.804e-25	3.519e-23
0.6616	2.548e+11	8.399e+02	6.826e+03	1.628e+00	1.323e+01
0.6938	2.306e+05	8.550e-04	6.578e-03	1.651e-06	1.270e-05
1.1732	1.413e+09	1.857e+01	8.307e+01	3.318e-02	1.485e-01
1.3325	1.413e+09	2.491e+01	9.954e+01	4.322e-02	1.727e-01
Totals	2.812e+11	8.834e+02	7.008e+03	1.705e+00	1.355e+01

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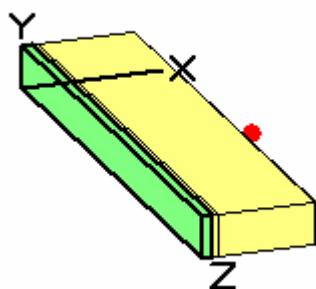
Case Title: PM-2A V-13
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)

Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in



Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	129.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.692e-260	6.373e-26	1.160e-260	4.368e-26
0.0318	5.862e+09	6.191e-33	3.512e-23	5.157e-35	2.926e-25
0.0322	1.082e+10	1.222e-31	7.046e-23	9.836e-34	5.671e-25
0.0364	3.936e+09	3.713e-23	5.308e-21	2.110e-25	3.016e-23
0.6616	2.548e+11	1.055e+03	8.453e+03	2.045e+00	1.639e+01
0.6938	2.306e+05	1.074e-03	8.159e-03	2.073e-06	1.575e-05
1.1732	1.413e+09	2.337e+01	1.045e+02	4.177e-02	1.868e-01
1.3325	1.413e+09	3.138e+01	1.256e+02	5.444e-02	2.179e-01
Totals	2.812e+11	1.110e+03	8.683e+03	2.141e+00	1.679e+01

Results - Dose Point # 2 - (186,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.430e-260	4.744e-26	9.800e-261	3.252e-26
0.0318	5.862e+09	5.424e-33	2.615e-23	4.518e-35	2.178e-25
0.0322	1.082e+10	1.068e-31	5.246e-23	8.598e-34	4.222e-25
0.0364	3.936e+09	3.176e-23	4.529e-21	1.804e-25	2.573e-23
0.6616	2.548e+11	8.399e+02	6.711e+03	1.628e+00	1.301e+01
0.6938	2.306e+05	8.550e-04	6.476e-03	1.651e-06	1.250e-05
1.1732	1.413e+09	1.857e+01	8.262e+01	3.318e-02	1.477e-01
1.3325	1.413e+09	2.491e+01	9.915e+01	4.322e-02	1.720e-01
Totals	2.812e+11	8.834e+02	6.893e+03	1.705e+00	1.333e+01

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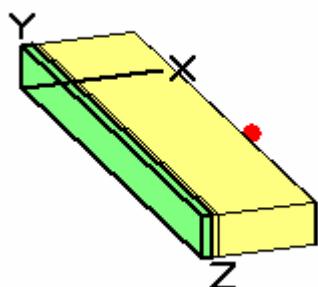
Case Title: PM-2A V-13
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)

Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in



Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	129.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Shield 3
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.692e-260	3.456e-26	1.160e-260	2.369e-26
0.0318	5.862e+09	6.191e-33	5.364e-25	5.157e-35	4.468e-27
0.0322	1.082e+10	1.222e-31	1.006e-24	9.836e-34	8.092e-27
0.0364	3.936e+09	3.713e-23	4.395e-23	2.110e-25	2.497e-25
0.6616	2.548e+11	1.055e+03	5.080e+03	2.045e+00	9.849e+00
0.6938	2.306e+05	1.074e-03	5.048e-03	2.073e-06	9.746e-06
1.1732	1.413e+09	2.337e+01	8.132e+01	4.177e-02	1.453e-01
1.3325	1.413e+09	3.138e+01	1.012e+02	5.444e-02	1.756e-01
Totals	2.812e+11	1.110e+03	5.263e+03	2.141e+00	1.017e+01

Results - Dose Point # 2 - (186,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.430e-260	2.573e-26	9.800e-261	1.764e-26
0.0318	5.862e+09	5.424e-33	3.993e-25	4.518e-35	3.326e-27
0.0322	1.082e+10	1.068e-31	7.485e-25	8.598e-34	6.024e-27
0.0364	3.936e+09	3.176e-23	3.754e-23	1.804e-25	2.133e-25
0.6616	2.548e+11	8.399e+02	4.037e+03	1.628e+00	7.827e+00
0.6938	2.306e+05	8.550e-04	4.011e-03	1.651e-06	7.743e-06
1.1732	1.413e+09	1.857e+01	6.433e+01	3.318e-02	1.150e-01
1.3325	1.413e+09	2.491e+01	7.999e+01	4.322e-02	1.388e-01
Totals	2.812e+11	8.834e+02	4.182e+03	1.705e+00	8.081e+00

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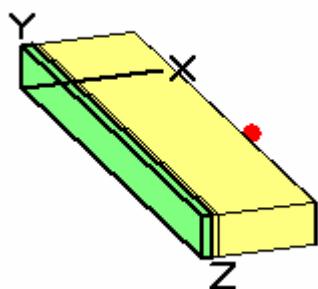
Case Title: PM-2A V-13
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)

Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in



Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	129.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.692e-260	6.373e-26	1.160e-260	4.368e-26
0.0318	5.862e+09	6.191e-33	3.512e-23	5.157e-35	2.926e-25
0.0322	1.082e+10	1.222e-31	7.046e-23	9.836e-34	5.671e-25
0.0364	3.936e+09	3.713e-23	5.308e-21	2.110e-25	3.016e-23
0.6616	2.548e+11	1.055e+03	8.453e+03	2.045e+00	1.639e+01
0.6938	2.306e+05	1.074e-03	8.159e-03	2.073e-06	1.575e-05
1.1732	1.413e+09	2.337e+01	1.045e+02	4.177e-02	1.868e-01
1.3325	1.413e+09	3.138e+01	1.256e+02	5.444e-02	2.179e-01
Totals	2.812e+11	1.110e+03	8.683e+03	2.141e+00	1.679e+01

Results - Dose Point # 2 - (186,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.430e-260	4.744e-26	9.800e-261	3.252e-26
0.0318	5.862e+09	5.424e-33	2.615e-23	4.518e-35	2.178e-25
0.0322	1.082e+10	1.068e-31	5.246e-23	8.598e-34	4.222e-25
0.0364	3.936e+09	3.176e-23	4.529e-21	1.804e-25	2.573e-23
0.6616	2.548e+11	8.399e+02	6.711e+03	1.628e+00	1.301e+01
0.6938	2.306e+05	8.550e-04	6.476e-03	1.651e-06	1.250e-05
1.1732	1.413e+09	1.857e+01	8.262e+01	3.318e-02	1.477e-01
1.3325	1.413e+09	2.491e+01	9.915e+01	4.322e-02	1.720e-01
Totals	2.812e+11	8.834e+02	6.893e+03	1.705e+00	1.333e+01

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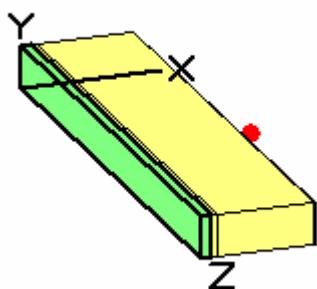
Case Title: PM-2A V-13
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	30.48 cm	(1 ft)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	140.132 cm	(4 ft 7.2 in)

Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	70.104 cm 2 ft 3.6 in	838.2 cm 27 ft 6.0 in



Shields

Shield N	Dimension	Material	Density
Source	4.37e+05 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	129.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	7.6531e+000	2.8317e+011	1.0688e+000	3.9547e+004
Co-60	3.8200e-002	1.4134e+009	5.3350e-003	1.9739e+002
Cs-137	8.0900e+000	2.9933e+011	1.1298e+000	4.1804e+004
Sr-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004
Y-90	8.5900e+000	3.1783e+011	1.1997e+000	4.4388e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.692e-260	3.799e-26	1.160e-260	2.604e-26
0.0318	5.862e+09	6.191e-33	1.060e-24	5.157e-35	8.826e-27
0.0322	1.082e+10	1.222e-31	2.031e-24	9.836e-34	1.635e-26
0.0364	3.936e+09	3.713e-23	1.177e-22	2.110e-25	6.689e-25
0.6616	2.548e+11	1.055e+03	6.698e+03	2.045e+00	1.299e+01
0.6938	2.306e+05	1.074e-03	6.548e-03	2.073e-06	1.264e-05
1.1732	1.413e+09	2.337e+01	9.292e+01	4.177e-02	1.661e-01
1.3325	1.413e+09	3.138e+01	1.135e+02	5.444e-02	1.968e-01
Totals	2.812e+11	1.110e+03	6.905e+03	2.141e+00	1.335e+01

Results - Dose Point # 2 - (186,27.6,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	2.940e+09	1.430e-260	2.828e-26	9.800e-261	1.938e-26
0.0318	5.862e+09	5.424e-33	7.888e-25	4.518e-35	6.570e-27
0.0322	1.082e+10	1.068e-31	1.512e-24	8.598e-34	1.217e-26
0.0364	3.936e+09	3.176e-23	1.006e-22	1.804e-25	5.714e-25
0.6616	2.548e+11	8.399e+02	5.320e+03	1.628e+00	1.031e+01
0.6938	2.306e+05	8.550e-04	5.200e-03	1.651e-06	1.004e-05
1.1732	1.413e+09	1.857e+01	7.349e+01	3.318e-02	1.313e-01
1.3325	1.413e+09	2.491e+01	8.961e+01	4.322e-02	1.555e-01
Totals	2.812e+11	8.834e+02	5.483e+03	1.705e+00	1.060e+01

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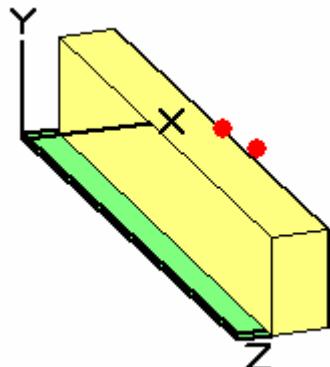
Case Title: PM-2A Tanks
Description: V-14 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	91.44 cm	(3 ft)
Width	1.5e+3 cm	(50 ft)
Height	15.24 cm	(6.0 in)

Dose Points

A	X	Y	Z
# 1	2.43e+02 cm 7 ft 11.6 in	190.5 cm 6 ft 3.0 in	762 cm 25 ft
# 2	2.71e+02 cm 8 ft 10.6 in	190.5 cm 6 ft 3.0 in	762 cm 25 ft
# 3	3.32e+02 cm 10 ft 10.6 in	190.5 cm 6 ft 3.0 in	762 cm 25 ft
# 4	4.23e+02 cm 13 ft 10.6 in	190.5 cm 6 ft 3.0 in	762 cm 25 ft
# 5	2.43e+02 cm 7 ft 11.6 in	254 cm 8 ft 4.0 in	762 cm 25 ft



Shields

Shield N	Dimension	Material	Density
Source	1.30e+05 in ³	V123 SLUDGE	1.02
Shield 1	.570 in	Air	0.00122
Shield 2	.563 in	Iron	7.86
Shield 3	1.0 in	Air	0.00122
Air Gap		Air	0.00122
Immersion		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Am-241	1.8600e-003	6.8820e+007	8.7580e-004	3.2405e+001
Ba-137m	1.9015e+001	7.0354e+011	8.9533e+000	3.3127e+005
C-14	2.1000e-004	7.7700e+006	9.8881e-005	3.6586e+000
Cm-243	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Cm-244	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Co-60	9.1700e-002	3.3929e+009	4.3178e-002	1.5976e+003
Cs-137	2.0100e+001	7.4370e+011	9.4643e+000	3.5018e+005
Fe-55	1.7400e-003	6.4380e+007	8.1930e-004	3.0314e+001
H-3	1.4000e-002	5.1800e+008	6.5921e-003	2.4391e+002
Ni-59	3.4000e-002	1.2580e+009	1.6009e-002	5.9234e+002
Ni-63	3.3200e+000	1.2284e+011	1.5633e+000	5.7841e+004
Pu-238	8.1500e-003	3.0155e+008	3.8375e-003	1.4199e+002
Pu-239	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-240	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-241	8.6500e-003	3.2005e+008	4.0730e-003	1.5070e+002
Sr-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005
Tc-99	2.2500e-003	8.3250e+007	1.0594e-003	3.9199e+001
U-233	4.4900e-005	1.6613e+006	2.1142e-005	7.8224e-001
U-234	1.5000e-002	5.5500e+008	7.0629e-003	2.6133e+002
U-235	4.9900e-004	1.8463e+007	2.3496e-004	8.6935e+000
U-236	9.5300e-005	3.5261e+006	4.4873e-005	1.6603e+000
U-238	1.7700e-004	6.5490e+006	8.3343e-005	3.0837e+000
Y-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	10
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (95.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	9.312e-25	0.000e+00	7.987e-26
0.03	4.144e+10	1.498e-49	2.619e-22	1.484e-51	2.596e-24
0.04	9.779e+09	2.020e-22	5.577e-20	8.933e-25	2.467e-22
0.05	7.920e+05	4.646e-16	2.332e-13	1.238e-18	6.214e-16
0.06	2.499e+07	1.035e-09	4.890e-07	2.057e-12	9.714e-10
0.08	5.246e+05	2.947e-07	6.745e-05	4.664e-10	1.067e-07
0.1	3.621e+06	8.505e-05	9.315e-03	1.301e-07	1.425e-05
0.15	2.859e+06	1.757e-03	5.965e-02	2.894e-06	9.823e-05
0.2	1.190e+07	2.340e-02	4.405e-01	4.130e-05	7.774e-04
0.3	5.401e+05	3.189e-03	3.275e-02	6.049e-06	6.213e-05
0.6	6.330e+11	1.603e+04	7.807e+04	3.128e+01	1.524e+02
1.0	3.393e+09	2.273e+02	7.298e+02	4.190e-01	1.345e+00
1.5	3.393e+09	4.720e+02	1.163e+03	7.941e-01	1.957e+00
Totals	6.990e+11	1.673e+04	7.996e+04	3.250e+01	1.557e+02

Results - Dose Point # 2 - (106.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	8.468e-25	0.000e+00	7.263e-26
0.03	4.144e+10	7.595e-48	2.382e-22	7.527e-50	2.360e-24
0.04	9.779e+09	1.229e-21	3.224e-19	5.436e-24	1.426e-21
0.05	7.920e+05	1.300e-15	6.107e-13	3.463e-18	1.627e-15
0.06	2.499e+07	2.015e-09	8.832e-07	4.002e-12	1.754e-09
0.08	5.246e+05	4.083e-07	8.579e-05	6.462e-10	1.358e-07
0.1	3.621e+06	1.016e-04	1.023e-02	1.555e-07	1.565e-05
0.15	2.859e+06	1.849e-03	5.860e-02	3.044e-06	9.650e-05
0.2	1.190e+07	2.370e-02	4.214e-01	4.183e-05	7.438e-04
0.3	5.401e+05	3.144e-03	3.090e-02	5.963e-06	5.861e-05
0.6	6.330e+11	1.543e+04	7.300e+04	3.011e+01	1.425e+02
1.0	3.393e+09	2.162e+02	6.798e+02	3.985e-01	1.253e+00
1.5	3.393e+09	4.455e+02	1.081e+03	7.495e-01	1.818e+00
Totals	6.990e+11	1.609e+04	7.476e+04	3.126e+01	1.456e+02

Results - Dose Point # 3 - (130.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	3.676e-316	6.903e-25	3.153e-317	5.921e-26
0.03	4.144e+10	2.174e-45	1.942e-22	2.155e-47	1.924e-24
0.04	9.779e+09	1.685e-20	4.123e-18	7.454e-23	1.824e-20
0.05	7.920e+05	5.698e-15	2.412e-12	1.518e-17	6.425e-15
0.06	2.499e+07	5.007e-09	1.940e-06	9.945e-12	3.853e-09
0.08	5.246e+05	5.935e-07	1.091e-04	9.392e-10	1.726e-07
0.1	3.621e+06	1.185e-04	1.053e-02	1.812e-07	1.611e-05
0.15	2.859e+06	1.796e-03	5.185e-02	2.958e-06	8.539e-05
0.2	1.190e+07	2.186e-02	3.605e-01	3.857e-05	6.363e-04
0.3	5.401e+05	2.795e-03	2.597e-02	5.301e-06	4.927e-05
0.6	6.330e+11	1.330e+04	6.083e+04	2.596e+01	1.187e+02
1.0	3.393e+09	1.837e+02	5.647e+02	3.387e-01	1.041e+00
1.5	3.393e+09	3.755e+02	8.960e+02	6.317e-01	1.508e+00
Totals	6.990e+11	1.386e+04	6.229e+04	2.693e+01	1.213e+02

Results - Dose Point # 4 - (166.5625,75,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	9.267e-303	5.177e-25	7.948e-304	4.440e-26
0.03	4.144e+10	2.185e-43	1.456e-22	2.165e-45	1.443e-24
0.04	9.779e+09	1.407e-19	3.230e-17	6.223e-22	1.429e-19
0.05	7.920e+05	1.725e-14	6.614e-12	4.596e-17	1.762e-14
0.06	2.499e+07	9.042e-09	3.128e-06	1.796e-11	6.212e-09
0.08	5.246e+05	6.763e-07	1.111e-04	1.070e-09	1.759e-07
0.1	3.621e+06	1.130e-04	9.099e-03	1.729e-07	1.392e-05
0.15	2.859e+06	1.487e-03	3.995e-02	2.448e-06	6.579e-05
0.2	1.190e+07	1.736e-02	2.708e-01	3.064e-05	4.779e-04
0.3	5.401e+05	2.157e-03	1.928e-02	4.092e-06	3.657e-05
0.6	6.330e+11	1.004e+04	4.503e+04	1.960e+01	8.789e+01
1.0	3.393e+09	1.375e+02	4.185e+02	2.535e-01	7.713e-01
1.5	3.393e+09	2.800e+02	6.649e+02	4.712e-01	1.119e+00
Totals	6.990e+11	1.046e+04	4.611e+04	2.032e+01	8.978e+01

Results - Dose Point # 5 - (95.5625,100,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	7.569e-25	0.000e+00	6.492e-26
0.03	4.144e+10	2.487e-56	2.129e-22	2.465e-58	2.110e-24
0.04	9.779e+09	1.609e-25	4.858e-22	7.118e-28	2.149e-24
0.05	7.920e+05	8.302e-18	5.355e-15	2.212e-20	1.427e-17
0.06	2.499e+07	7.513e-11	4.614e-08	1.492e-13	9.164e-11
0.08	5.246e+05	6.920e-08	2.054e-05	1.095e-10	3.251e-08
0.1	3.621e+06	3.167e-05	4.440e-03	4.844e-08	6.793e-06
0.15	2.859e+06	9.590e-04	3.989e-02	1.579e-06	6.568e-05
0.2	1.190e+07	1.429e-02	3.193e-01	2.522e-05	5.635e-04
0.3	5.401e+05	2.111e-03	2.481e-02	4.004e-06	4.707e-05
0.6	6.330e+11	1.142e+04	6.072e+04	2.228e+01	1.185e+02
1.0	3.393e+09	1.681e+02	5.739e+02	3.098e-01	1.058e+00
1.5	3.393e+09	3.571e+02	9.212e+02	6.009e-01	1.550e+00
Totals	6.990e+11	1.194e+04	6.222e+04	2.319e+01	1.211e+02

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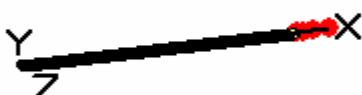
Case Title: PM-2A Tanks
Description: V-14 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.5e+3 cm	(50 ft)
Width	91.44 cm	(3 ft)
Height	15.24 cm	(6.0 in)

Dose Points

A	X	Y	Z
# 1	1.58e+03 cm 51 ft 10.1 in	7.62 cm 3.0 in	45.72 cm 1 ft 6.0 in
# 2	1.61e+03 cm 52 ft 9.1 in	7.62 cm 3.0 in	45.72 cm 1 ft 6.0 in
# 3	1.67e+03 cm 54 ft 9.1 in	7.62 cm 3.0 in	45.72 cm 1 ft 6.0 in
# 4	1.76e+03 cm 57 ft 9.1 in	7.62 cm 3.0 in	45.72 cm 1 ft 6.0 in



Shields

Shield N	Dimension	Material	Density
Source	1.30e+05 in ³	V123 SLUDGE	1.02
Shield 1	.562 in	Iron	7.85
Shield 2	19.5 in	Concrete	2.35
Shield 3	1.0 in	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Am-241	1.8600e-003	6.8820e+007	8.7580e-004	3.2405e+001
Ba-137m	1.9015e+001	7.0354e+011	8.9533e+000	3.3127e+005
C-14	2.1000e-004	7.7700e+006	9.8881e-005	3.6586e+000
Cm-243	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Cm-244	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Co-60	9.1700e-002	3.3929e+009	4.3178e-002	1.5976e+003
Cs-137	2.0100e+001	7.4370e+011	9.4643e+000	3.5018e+005
Fe-55	1.7400e-003	6.4380e+007	8.1930e-004	3.0314e+001
H-3	1.4000e-002	5.1800e+008	6.5921e-003	2.4391e+002
Ni-59	3.4000e-002	1.2580e+009	1.6009e-002	5.9234e+002
Ni-63	3.3200e+000	1.2284e+011	1.5633e+000	5.7841e+004
Pu-238	8.1500e-003	3.0155e+008	3.8375e-003	1.4199e+002
Pu-239	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-240	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-241	8.6500e-003	3.2005e+008	4.0730e-003	1.5070e+002
Sr-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005
Tc-99	2.2500e-003	8.3250e+007	1.0594e-003	3.9199e+001
U-233	4.4900e-005	1.6613e+006	2.1142e-005	7.8224e-001
U-234	1.5000e-002	5.5500e+008	7.0629e-003	2.6133e+002
U-235	4.9900e-004	1.8463e+007	2.3496e-004	8.6935e+000
U-236	9.5300e-005	3.5261e+006	4.4873e-005	1.6603e+000
U-238	1.7700e-004	6.5490e+006	8.3343e-005	3.0837e+000
Y-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	10
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (622.0625,3,18) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	1.301e-24	0.000e+00	1.116e-25
0.03	4.144e+10	2.729e-107	9.592e-23	2.704e-109	9.506e-25
0.04	9.779e+09	7.553e-51	2.026e-22	3.340e-53	8.962e-25
0.05	7.920e+05	2.592e-34	1.089e-25	6.906e-37	2.902e-28
0.06	2.499e+07	1.445e-23	1.663e-20	2.870e-26	3.303e-23
0.08	5.246e+05	1.326e-17	2.073e-14	2.098e-20	3.280e-17
0.1	3.621e+06	9.171e-14	1.453e-10	1.403e-16	2.223e-13
0.15	2.859e+06	5.345e-11	5.514e-08	8.801e-14	9.079e-11
0.2	1.190e+07	4.043e-09	2.489e-06	7.136e-12	4.394e-09
0.3	5.401e+05	4.814e-09	1.279e-06	9.131e-12	2.427e-09
0.6	6.330e+11	6.674e-01	4.034e+01	1.303e-03	7.873e-02
1.0	3.393e+09	8.005e-02	1.845e+00	1.476e-04	3.402e-03
1.5	3.393e+09	7.303e-01	8.834e+00	1.229e-03	1.486e-02
Totals	6.990e+11	1.478e+00	5.102e+01	2.679e-03	9.700e-02

Results - Dose Point # 2 - (633.0625,3,18) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	8.854e-25	0.000e+00	7.594e-26
0.03	4.144e+10	2.293e-107	6.527e-23	2.272e-109	6.469e-25
0.04	9.779e+09	5.950e-51	1.379e-22	2.631e-53	6.098e-25
0.05	7.920e+05	1.984e-34	7.412e-26	5.286e-37	1.974e-28
0.06	2.499e+07	1.089e-23	1.251e-20	2.163e-26	2.486e-23
0.08	5.246e+05	9.796e-18	1.525e-14	1.550e-20	2.413e-17
0.1	3.621e+06	6.681e-14	1.051e-10	1.022e-16	1.607e-13
0.15	2.859e+06	3.814e-11	3.886e-08	6.281e-14	6.399e-11
0.2	1.190e+07	2.851e-09	1.730e-06	5.032e-12	3.053e-09
0.3	5.401e+05	3.340e-09	8.734e-07	6.335e-12	1.657e-09
0.6	6.330e+11	4.490e-01	2.669e+01	8.764e-04	5.210e-02
1.0	3.393e+09	5.251e-02	1.192e+00	9.679e-05	2.197e-03
1.5	3.393e+09	4.695e-01	5.599e+00	7.899e-04	9.420e-03
Totals	6.990e+11	9.710e-01	3.348e+01	1.763e-03	6.372e-02

Results - Dose Point # 3 - (657.0625,3,18) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	5.052e-25	0.000e+00	4.333e-26
0.03	4.144e+10	1.589e-107	3.724e-23	1.575e-109	3.691e-25
0.04	9.779e+09	3.907e-51	7.868e-23	1.728e-53	3.480e-25
0.05	7.920e+05	1.256e-34	4.229e-26	3.346e-37	1.127e-28
0.06	2.499e+07	6.644e-24	7.597e-21	1.320e-26	1.509e-23
0.08	5.246e+05	5.630e-18	8.659e-15	8.909e-21	1.370e-17
0.1	3.621e+06	3.704e-14	5.728e-11	5.667e-17	8.763e-14
0.15	2.859e+06	2.027e-11	2.020e-08	3.337e-14	3.327e-11
0.2	1.190e+07	1.484e-09	8.798e-07	2.618e-12	1.553e-09
0.3	5.401e+05	1.695e-09	4.332e-07	3.215e-12	8.218e-10
0.6	6.330e+11	2.187e-01	1.275e+01	4.270e-04	2.489e-02
1.0	3.393e+09	2.486e-02	5.551e-01	4.582e-05	1.023e-03
1.5	3.393e+09	2.178e-01	2.563e+00	3.665e-04	4.313e-03
Totals	6.990e+11	4.614e-01	1.587e+01	8.393e-04	3.022e-02

Results - Dose Point # 4 - (693.0625,3,18) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	2.958e-25	0.000e+00	2.537e-26
0.03	4.144e+10	1.031e-107	2.181e-23	1.022e-109	2.161e-25
0.04	9.779e+09	2.386e-51	4.607e-23	1.055e-53	2.038e-25
0.05	7.920e+05	7.124e-35	2.476e-26	1.898e-37	6.597e-29
0.06	2.499e+07	3.558e-24	4.042e-21	7.066e-27	8.029e-24
0.08	5.246e+05	2.827e-18	4.305e-15	4.474e-21	6.812e-18
0.1	3.621e+06	1.806e-14	2.759e-11	2.762e-17	4.221e-14
0.15	2.859e+06	9.593e-12	9.435e-09	1.580e-14	1.554e-11
0.2	1.190e+07	6.933e-10	4.058e-07	1.224e-12	7.162e-10
0.3	5.401e+05	7.807e-10	1.972e-07	1.481e-12	3.741e-10
0.6	6.330e+11	9.870e-02	5.699e+00	1.927e-04	1.112e-02
1.0	3.393e+09	1.107e-02	2.455e-01	2.041e-05	4.526e-04
1.5	3.393e+09	9.624e-02	1.127e+00	1.619e-04	1.897e-03
Totals	6.990e+11	2.060e-01	7.072e+00	3.750e-04	1.347e-02

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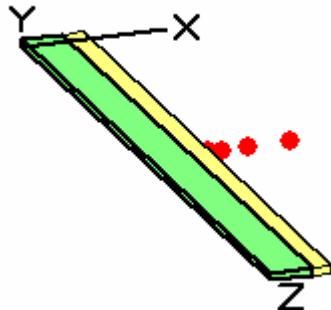
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By :
Checked :

Case Title: PM-2A Tanks
Description: V-14 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	91.44 cm	(3 ft)
Width	1.5e+3 cm	(50 ft)
Height	15.24 cm	(6.0 in)

Dose Points



A	X	Y	Z
# 1	1.49e+02 cm 4 ft 10.6 in	7.62 cm 3.0 in	762 cm 25 ft
# 2	1.77e+02 cm 5 ft 9.6 in	7.62 cm 3.0 in	762 cm 25 ft
# 3	2.38e+02 cm 7 ft 9.6 in	7.62 cm 3.0 in	762 cm 25 ft
# 4	3.29e+02 cm 10 ft 9.6 in	7.62 cm 3.0 in	762 cm 25 ft

Shields

Shield N	Dimension	Material	Density
Source	1.30e+05 in ³	V123 SLUDGE	1.02
Shield 1	.562 in	Iron	7.85
Shield 2	20.0 in	Concrete	2.35
Shield 3	1.0 in	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Am-241	1.8600e-003	6.8820e+007	8.7580e-004	3.2405e+001
Ba-137m	1.9015e+001	7.0354e+011	8.9533e+000	3.3127e+005
C-14	2.1000e-004	7.7700e+006	9.8881e-005	3.6586e+000
Cm-243	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Cm-244	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Co-60	9.1700e-002	3.3929e+009	4.3178e-002	1.5976e+003
Cs-137	2.0100e+001	7.4370e+011	9.4643e+000	3.5018e+005
Fe-55	1.7400e-003	6.4380e+007	8.1930e-004	3.0314e+001
H-3	1.4000e-002	5.1800e+008	6.5921e-003	2.4391e+002
Ni-59	3.4000e-002	1.2580e+009	1.6009e-002	5.9234e+002
Ni-63	3.3200e+000	1.2284e+011	1.5633e+000	5.7841e+004
Pu-238	8.1500e-003	3.0155e+008	3.8375e-003	1.4199e+002
Pu-239	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-240	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-241	8.6500e-003	3.2005e+008	4.0730e-003	1.5070e+002
Sr-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005
Tc-99	2.2500e-003	8.3250e+007	1.0594e-003	3.9199e+001
U-233	4.4900e-005	1.6613e+006	2.1142e-005	7.8224e-001
U-234	1.5000e-002	5.5500e+008	7.0629e-003	2.6133e+002
U-235	4.9900e-004	1.8463e+007	2.3496e-004	8.6935e+000
U-236	9.5300e-005	3.5261e+006	4.4873e-005	1.6603e+000
U-238	1.7700e-004	6.5490e+006	8.3343e-005	3.0837e+000
Y-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	10
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (58.5625,3,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	2.444e-24	0.000e+00	2.097e-25
0.03	4.144e+10	2.070e-99	1.802e-22	2.052e-101	1.786e-24
0.04	9.779e+09	3.004e-47	3.807e-22	1.329e-49	1.684e-24
0.05	7.920e+05	2.815e-32	2.046e-25	7.498e-35	5.451e-28
0.06	2.499e+07	3.142e-22	2.987e-19	6.240e-25	5.933e-22
0.08	5.246e+05	7.722e-17	9.674e-14	1.222e-19	1.531e-16
0.1	3.621e+06	3.204e-13	4.014e-10	4.901e-16	6.142e-13
0.15	2.859e+06	1.160e-10	9.550e-08	1.910e-13	1.573e-10
0.2	1.190e+07	7.195e-09	3.623e-06	1.270e-11	6.394e-09
0.3	5.401e+05	6.983e-09	1.584e-06	1.325e-11	3.005e-09
0.6	6.330e+11	7.621e-01	4.254e+01	1.488e-03	8.304e-02
1.0	3.393e+09	8.329e-02	1.867e+00	1.535e-04	3.441e-03
1.5	3.393e+09	7.432e-01	9.004e+00	1.250e-03	1.515e-02
Totals	6.990e+11	1.589e+00	5.342e+01	2.892e-03	1.016e-01

Results - Dose Point # 2 - (69.5625,3,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	1.820e-24	0.000e+00	1.561e-25
0.03	4.144e+10	6.977e-99	1.342e-22	6.914e-101	1.330e-24
0.04	9.779e+09	3.632e-47	2.835e-22	1.606e-49	1.254e-24
0.05	7.920e+05	2.328e-32	1.524e-25	6.201e-35	4.059e-28
0.06	2.499e+07	2.203e-22	2.057e-19	4.375e-25	4.086e-22
0.08	5.246e+05	4.831e-17	5.983e-14	7.645e-20	9.467e-17
0.1	3.621e+06	1.963e-13	2.461e-10	3.004e-16	3.765e-13
0.15	2.859e+06	7.198e-11	6.054e-08	1.185e-13	9.970e-11
0.2	1.190e+07	4.551e-09	2.361e-06	8.033e-12	4.166e-09
0.3	5.401e+05	4.559e-09	1.070e-06	8.648e-12	2.029e-09
0.6	6.330e+11	5.271e-01	3.021e+01	1.029e-03	5.896e-02
1.0	3.393e+09	5.960e-02	1.356e+00	1.099e-04	2.500e-03
1.5	3.393e+09	5.407e-01	6.606e+00	9.098e-04	1.111e-02
Totals	6.990e+11	1.127e+00	3.817e+01	2.049e-03	7.258e-02

Results - Dose Point # 3 - (93.5625,3,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	1.146e-24	0.000e+00	9.826e-26
0.03	4.144e+10	7.417e-99	8.445e-23	7.351e-101	8.370e-25
0.04	9.779e+09	2.156e-47	1.784e-22	9.534e-50	7.891e-25
0.05	7.920e+05	1.172e-32	9.590e-26	3.121e-35	2.555e-28
0.06	2.499e+07	1.109e-22	1.043e-19	2.203e-25	2.072e-22
0.08	5.246e+05	2.658e-17	3.366e-14	4.206e-20	5.327e-17
0.1	3.621e+06	1.140e-13	1.465e-10	1.745e-16	2.242e-13
0.15	2.859e+06	4.380e-11	3.747e-08	7.213e-14	6.171e-11
0.2	1.190e+07	2.809e-09	1.472e-06	4.957e-12	2.598e-09
0.3	5.401e+05	2.840e-09	6.688e-07	5.387e-12	1.269e-09
0.6	6.330e+11	3.291e-01	1.884e+01	6.424e-04	3.677e-02
1.0	3.393e+09	3.716e-02	8.457e-01	6.850e-05	1.559e-03
1.5	3.393e+09	3.376e-01	4.133e+00	5.680e-04	6.954e-03
Totals	6.990e+11	7.039e-01	2.382e+01	1.279e-03	4.528e-02

Results - Dose Point # 4 - (129.5625,3,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	0.000e+00	7.038e-25	0.000e+00	6.036e-26
0.03	4.144e+10	4.047e-99	5.188e-23	4.011e-101	5.142e-25
0.04	9.779e+09	1.150e-47	1.096e-22	5.086e-50	4.847e-25
0.05	7.920e+05	7.068e-33	5.891e-26	1.883e-35	1.569e-28
0.06	2.499e+07	7.032e-23	6.637e-20	1.397e-25	1.318e-22
0.08	5.246e+05	1.682e-17	2.125e-14	2.662e-20	3.362e-17
0.1	3.621e+06	7.142e-14	9.146e-11	1.093e-16	1.399e-13
0.15	2.859e+06	2.721e-11	2.327e-08	4.481e-14	3.832e-11
0.2	1.190e+07	1.743e-09	9.153e-07	3.077e-12	1.615e-09
0.3	5.401e+05	1.766e-09	4.173e-07	3.350e-12	7.916e-10
0.6	6.330e+11	2.062e-01	1.186e+01	4.024e-04	2.315e-02
1.0	3.393e+09	2.346e-02	5.365e-01	4.324e-05	9.888e-04
1.5	3.393e+09	2.145e-01	2.639e+00	3.609e-04	4.440e-03
Totals	6.990e+11	4.441e-01	1.503e+01	8.066e-04	2.858e-02

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By :
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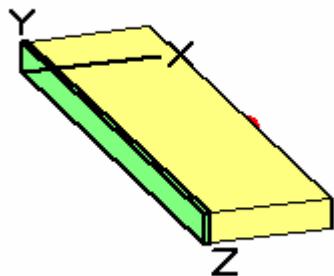
Case Title: PM-2A Tanks
Description: V-14 EXPOSURE
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	15.24 cm	(6.0 in)
Width	1.5e+3 cm	(50 ft)
Height	91.44 cm	(3 ft)

Dose Points

A	X	Y	Z
# 1	3.88e+02 cm 12 ft 8.6 in	45.72 cm 1 ft 6.0 in	762 cm 25 ft
# 2	4.15e+02 cm 13 ft 7.6 in	45.72 cm 1 ft 6.0 in	762 cm 25 ft
# 3	4.76e+02 cm 15 ft 7.6 in	45.72 cm 1 ft 6.0 in	762 cm 25 ft
# 4	5.68e+02 cm 18 ft 7.6 in	45.72 cm 1 ft 6.0 in	762 cm 25 ft



Shields

Shield N	Dimension	Material	Density
Source	1.30e+05 in ³	V123 SLUDGE	1.02
Shield 1	144.0 in	Air	0.00122
Shield 2	.562 in	Iron	7.86
Shield 3	1.0 in	Air	0.00122
Air Gap		Air	0.00122

Source Input : Grouping Method - Standard Indices

Number of Groups : 25

Lower Energy Cutoff : 0.015

Photons < 0.015 : Included

Library : Grove

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Am-241	1.8600e-003	6.8820e+007	8.7580e-004	3.2405e+001
Ba-137m	1.9015e+001	7.0354e+011	8.9533e+000	3.3127e+005
C-14	2.1000e-004	7.7700e+006	9.8881e-005	3.6586e+000
Cm-243	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Cm-244	9.8600e-005	3.6482e+006	4.6427e-005	1.7178e+000
Co-60	9.1700e-002	3.3929e+009	4.3178e-002	1.5976e+003
Cs-137	2.0100e+001	7.4370e+011	9.4643e+000	3.5018e+005
Fe-55	1.7400e-003	6.4380e+007	8.1930e-004	3.0314e+001
H-3	1.4000e-002	5.1800e+008	6.5921e-003	2.4391e+002
Ni-59	3.4000e-002	1.2580e+009	1.6009e-002	5.9234e+002
Ni-63	3.3200e+000	1.2284e+011	1.5633e+000	5.7841e+004
Pu-238	8.1500e-003	3.0155e+008	3.8375e-003	1.4199e+002
Pu-239	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-240	7.0600e-003	2.6122e+008	3.3243e-003	1.2300e+002
Pu-241	8.6500e-003	3.2005e+008	4.0730e-003	1.5070e+002
Sr-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005
Tc-99	2.2500e-003	8.3250e+007	1.0594e-003	3.9199e+001
U-233	4.4900e-005	1.6613e+006	2.1142e-005	7.8224e-001
U-234	1.5000e-002	5.5500e+008	7.0629e-003	2.6133e+002
U-235	4.9900e-004	1.8463e+007	2.3496e-004	8.6935e+000
U-236	9.5300e-005	3.5261e+006	4.4873e-005	1.6603e+000
U-238	1.7700e-004	6.5490e+006	8.3343e-005	3.0837e+000
Y-90	1.6800e+001	6.2160e+011	7.9105e+000	2.9269e+005

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	10
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (152.5625,18,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	1.529e-278	5.888e-25	1.312e-279	5.051e-26
0.03	4.144e+10	3.216e-39	1.656e-22	3.188e-41	1.641e-24
0.04	9.779e+09	1.816e-17	3.638e-15	8.030e-20	1.609e-17
0.05	7.920e+05	3.450e-13	1.101e-10	9.192e-16	2.934e-13
0.06	2.499e+07	7.606e-08	2.162e-05	1.511e-10	4.294e-08
0.08	5.246e+05	2.757e-06	3.698e-04	4.363e-09	5.851e-07
0.1	3.621e+06	3.498e-04	2.276e-02	5.351e-07	3.481e-05
0.15	2.859e+06	3.663e-03	7.809e-02	6.032e-06	1.286e-04
0.2	1.190e+07	3.970e-02	4.887e-01	7.006e-05	8.626e-04
0.3	5.401e+05	4.613e-03	3.269e-02	8.751e-06	6.200e-05
0.6	6.330e+11	1.953e+04	7.150e+04	3.811e+01	1.396e+02
1.0	3.393e+09	2.487e+02	6.360e+02	4.585e-01	1.172e+00
1.5	3.393e+09	4.773e+02	9.757e+02	8.031e-01	1.642e+00
Totals	6.990e+11	2.025e+04	7.311e+04	3.937e+01	1.424e+02

Results - Dose Point # 2 - (163.5625,18,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	1.401e-278	5.344e-25	1.201e-279	4.583e-26
0.03	4.144e+10	3.035e-39	1.503e-22	3.008e-41	1.490e-24
0.04	9.779e+09	1.698e-17	3.401e-15	7.508e-20	1.504e-17
0.05	7.920e+05	3.213e-13	1.026e-10	8.558e-16	2.732e-13
0.06	2.499e+07	7.069e-08	2.010e-05	1.404e-10	3.992e-08
0.08	5.246e+05	2.558e-06	3.435e-04	4.049e-09	5.435e-07
0.1	3.621e+06	3.243e-04	2.112e-02	4.962e-07	3.231e-05
0.15	2.859e+06	3.391e-03	7.218e-02	5.583e-06	1.189e-04
0.2	1.190e+07	3.670e-02	4.505e-01	6.478e-05	7.951e-04
0.3	5.401e+05	4.260e-03	3.006e-02	8.081e-06	5.702e-05
0.6	6.330e+11	1.800e+04	6.560e+04	3.513e+01	1.280e+02
1.0	3.393e+09	2.289e+02	5.827e+02	4.220e-01	1.074e+00
1.5	3.393e+09	4.387e+02	8.931e+02	7.381e-01	1.503e+00
Totals	6.990e+11	1.867e+04	6.708e+04	3.629e+01	1.306e+02

Results - Dose Point # 3 - (187.5625,18,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	1.169e-278	4.392e-25	1.003e-279	3.767e-26
0.03	4.144e+10	2.676e-39	1.235e-22	2.652e-41	1.224e-24
0.04	9.779e+09	1.479e-17	2.963e-15	6.541e-20	1.310e-17
0.05	7.920e+05	2.782e-13	8.883e-11	7.410e-16	2.366e-13
0.06	2.499e+07	6.103e-08	1.737e-05	1.212e-10	3.451e-08
0.08	5.246e+05	2.204e-06	2.966e-04	3.488e-09	4.693e-07
0.1	3.621e+06	2.790e-04	1.819e-02	4.268e-07	2.783e-05
0.15	2.859e+06	2.902e-03	6.149e-02	4.779e-06	1.013e-04
0.2	1.190e+07	3.132e-02	3.815e-01	5.528e-05	6.733e-04
0.3	5.401e+05	3.625e-03	2.533e-02	6.876e-06	4.805e-05
0.6	6.330e+11	1.525e+04	5.503e+04	2.977e+01	1.074e+02
1.0	3.393e+09	1.933e+02	4.875e+02	3.564e-01	8.987e-01
1.5	3.393e+09	3.694e+02	7.456e+02	6.216e-01	1.255e+00
Totals	6.990e+11	1.582e+04	5.627e+04	3.075e+01	1.096e+02

Results - Dose Point # 4 - (223.5625,18,300) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	7.925e+09	9.258e-279	3.380e-25	7.941e-280	2.899e-26
0.03	4.144e+10	2.241e-39	9.507e-23	2.221e-41	9.422e-25
0.04	9.779e+09	1.227e-17	2.459e-15	5.426e-20	1.087e-17
0.05	7.920e+05	2.297e-13	7.344e-11	6.119e-16	1.956e-13
0.06	2.499e+07	5.031e-08	1.435e-05	9.993e-11	2.851e-08
0.08	5.246e+05	1.813e-06	2.447e-04	2.869e-09	3.872e-07
0.1	3.621e+06	2.287e-04	1.490e-02	3.498e-07	2.280e-05
0.15	2.859e+06	2.355e-03	4.943e-02	3.878e-06	8.139e-05
0.2	1.190e+07	2.528e-02	3.039e-01	4.462e-05	5.365e-04
0.3	5.401e+05	2.911e-03	2.005e-02	5.523e-06	3.804e-05
0.6	6.330e+11	1.218e+04	4.333e+04	2.377e+01	8.458e+01
1.0	3.393e+09	1.536e+02	3.827e+02	2.832e-01	7.054e-01
1.5	3.393e+09	2.925e+02	5.839e+02	4.920e-01	9.824e-01
Totals	6.990e+11	1.262e+04	4.430e+04	2.454e+01	8.627e+01

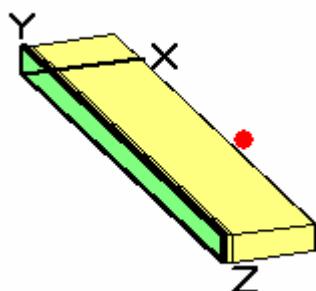
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By :
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Case Title: PM-2A V-14
Description: Dose at 45 degree angle at side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	281.813 cm 9 ft 2.9 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	371.983 cm 12 ft 2.4 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	97.95 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (110.95,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	3.204e-260	2.981e-26	2.196e-260	2.043e-26
0.0318	1.819e+09	8.929e-33	2.084e-23	7.437e-35	1.736e-25
0.0322	3.356e+09	1.756e-31	4.216e-23	1.413e-33	3.393e-25
0.0364	1.221e+09	5.149e-23	9.954e-21	2.926e-25	5.656e-23
0.6616	7.905e+10	8.918e+02	6.083e+03	1.729e+00	1.179e+01
0.6938	6.880e+04	8.660e-04	5.604e-03	1.672e-06	1.082e-05
1.1732	4.218e+08	1.712e+01	6.615e+01	3.060e-02	1.182e-01
1.3325	4.218e+08	2.244e+01	7.799e+01	3.894e-02	1.353e-01
Totals	8.720e+10	9.314e+02	6.227e+03	1.798e+00	1.205e+01

Results - Dose Point # 2 - (146.45,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.693e-260	2.084e-26	1.846e-260	1.428e-26
0.0318	1.819e+09	7.191e-33	1.457e-23	5.990e-35	1.214e-25
0.0322	3.356e+09	1.411e-31	2.947e-23	1.136e-33	2.372e-25
0.0364	1.221e+09	4.059e-23	7.835e-21	2.306e-25	4.452e-23
0.6616	7.905e+10	6.685e+02	4.553e+03	1.296e+00	8.827e+00
0.6938	6.880e+04	6.492e-04	4.193e-03	1.253e-06	8.096e-06
1.1732	4.218e+08	1.282e+01	4.931e+01	2.291e-02	8.812e-02
1.3325	4.218e+08	1.679e+01	5.807e+01	2.913e-02	1.007e-01
Totals	8.720e+10	6.981e+02	4.660e+03	1.348e+00	9.015e+00

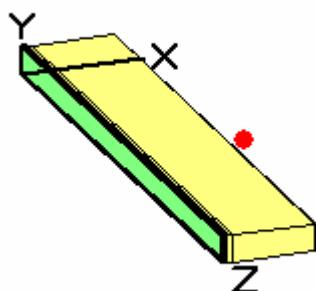
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By :
Checked :

Case Title: PM-2A V-14
Description: Dose at 45 degree angle at side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	281.813 cm 9 ft 2.9 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	371.983 cm 12 ft 2.4 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	97.95 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (110.95,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	3.204e-260	2.843e-26	2.196e-260	1.949e-26
0.0318	1.819e+09	8.929e-33	1.567e-23	7.437e-35	1.305e-25
0.0322	3.356e+09	1.756e-31	3.143e-23	1.413e-33	2.530e-25
0.0364	1.221e+09	5.149e-23	7.285e-21	2.926e-25	4.139e-23
0.6616	7.905e+10	8.918e+02	6.002e+03	1.729e+00	1.164e+01
0.6938	6.880e+04	8.660e-04	5.535e-03	1.672e-06	1.069e-05
1.1732	4.218e+08	1.712e+01	6.581e+01	3.060e-02	1.176e-01
1.3325	4.218e+08	2.244e+01	7.767e+01	3.894e-02	1.348e-01
Totals	8.720e+10	9.314e+02	6.145e+03	1.798e+00	1.189e+01

Results - Dose Point # 2 - (146.45,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.693e-260	1.987e-26	1.846e-260	1.362e-26
0.0318	1.819e+09	7.191e-33	1.095e-23	5.990e-35	9.122e-26
0.0322	3.356e+09	1.411e-31	2.197e-23	1.136e-33	1.768e-25
0.0364	1.221e+09	4.059e-23	5.735e-21	2.306e-25	3.258e-23
0.6616	7.905e+10	6.685e+02	4.492e+03	1.296e+00	8.709e+00
0.6938	6.880e+04	6.492e-04	4.142e-03	1.253e-06	7.996e-06
1.1732	4.218e+08	1.282e+01	4.905e+01	2.291e-02	8.766e-02
1.3325	4.218e+08	1.679e+01	5.783e+01	2.913e-02	1.003e-01
Totals	8.720e+10	6.981e+02	4.599e+03	1.348e+00	8.897e+00

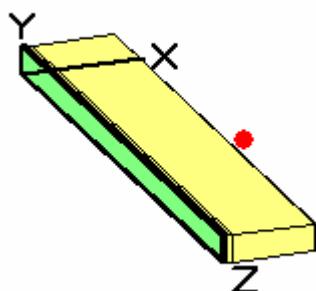
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By :
Checked :

Case Title: PM-2A V-14
Description: Dose at 45 degree angle at side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	281.813 cm 9 ft 2.9 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	371.983 cm 12 ft 2.4 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	97.95 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 3
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (110.95,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	3.204e-260	1.542e-26	2.196e-260	1.057e-26
0.0318	1.819e+09	8.929e-33	2.393e-25	7.437e-35	1.993e-27
0.0322	3.356e+09	1.756e-31	4.485e-25	1.413e-33	3.610e-27
0.0364	1.221e+09	5.149e-23	6.054e-23	2.926e-25	3.440e-25
0.6616	7.905e+10	8.918e+02	3.772e+03	1.729e+00	7.312e+00
0.6938	6.880e+04	8.660e-04	3.572e-03	1.672e-06	6.897e-06
1.1732	4.218e+08	1.712e+01	5.245e+01	3.060e-02	9.372e-02
1.3325	4.218e+08	2.244e+01	6.393e+01	3.894e-02	1.109e-01
Totals	8.720e+10	9.314e+02	3.888e+03	1.798e+00	7.516e+00

Results - Dose Point # 2 - (146.45,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.693e-260	1.078e-26	1.846e-260	7.387e-27
0.0318	1.819e+09	7.191e-33	1.672e-25	5.990e-35	1.393e-27
0.0322	3.356e+09	1.411e-31	3.135e-25	1.136e-33	2.523e-27
0.0364	1.221e+09	4.059e-23	4.770e-23	2.306e-25	2.710e-25
0.6616	7.905e+10	6.685e+02	2.825e+03	1.296e+00	5.476e+00
0.6938	6.880e+04	6.492e-04	2.675e-03	1.253e-06	5.164e-06
1.1732	4.218e+08	1.282e+01	3.913e+01	2.291e-02	6.992e-02
1.3325	4.218e+08	1.679e+01	4.763e+01	2.913e-02	8.263e-02
Totals	8.720e+10	6.981e+02	2.911e+03	1.348e+00	5.629e+00

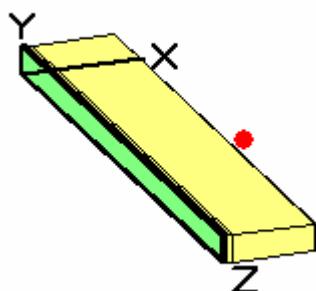
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Duration : 00:00:24

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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at 45 degree angle at side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	281.813 cm 9 ft 2.9 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	371.983 cm 12 ft 2.4 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	97.95 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (110.95,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	3.204e-260	2.843e-26	2.196e-260	1.949e-26
0.0318	1.819e+09	8.929e-33	1.567e-23	7.437e-35	1.305e-25
0.0322	3.356e+09	1.756e-31	3.143e-23	1.413e-33	2.530e-25
0.0364	1.221e+09	5.149e-23	7.285e-21	2.926e-25	4.139e-23
0.6616	7.905e+10	8.918e+02	6.002e+03	1.729e+00	1.164e+01
0.6938	6.880e+04	8.660e-04	5.535e-03	1.672e-06	1.069e-05
1.1732	4.218e+08	1.712e+01	6.581e+01	3.060e-02	1.176e-01
1.3325	4.218e+08	2.244e+01	7.767e+01	3.894e-02	1.348e-01
Totals	8.720e+10	9.314e+02	6.145e+03	1.798e+00	1.189e+01

Results - Dose Point # 2 - (146.45,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.693e-260	1.987e-26	1.846e-260	1.362e-26
0.0318	1.819e+09	7.191e-33	1.095e-23	5.990e-35	9.122e-26
0.0322	3.356e+09	1.411e-31	2.197e-23	1.136e-33	1.768e-25
0.0364	1.221e+09	4.059e-23	5.735e-21	2.306e-25	3.258e-23
0.6616	7.905e+10	6.685e+02	4.492e+03	1.296e+00	8.709e+00
0.6938	6.880e+04	6.492e-04	4.142e-03	1.253e-06	7.996e-06
1.1732	4.218e+08	1.282e+01	4.905e+01	2.291e-02	8.766e-02
1.3325	4.218e+08	1.679e+01	5.783e+01	2.913e-02	1.003e-01
Totals	8.720e+10	6.981e+02	4.599e+03	1.348e+00	8.897e+00

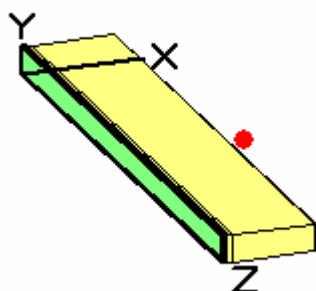
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By :
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Case Title: PM-2A V-14
Description: Dose at 45 degree angle at side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	281.813 cm 9 ft 2.9 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	371.983 cm 12 ft 2.4 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	97.95 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (110.95,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	3.204e-260	1.694e-26	2.196e-260	1.161e-26
0.0318	1.819e+09	8.929e-33	4.726e-25	7.437e-35	3.937e-27
0.0322	3.356e+09	1.756e-31	9.062e-25	1.413e-33	7.293e-27
0.0364	1.221e+09	5.149e-23	1.623e-22	2.926e-25	9.219e-25
0.6616	7.905e+10	8.918e+02	4.861e+03	1.729e+00	9.423e+00
0.6938	6.880e+04	8.660e-04	4.535e-03	1.672e-06	8.756e-06
1.1732	4.218e+08	1.712e+01	5.924e+01	3.060e-02	1.059e-01
1.3325	4.218e+08	2.244e+01	7.094e+01	3.894e-02	1.231e-01
Totals	8.720e+10	9.314e+02	4.991e+03	1.798e+00	9.652e+00

Results - Dose Point # 2 - (146.45,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.693e-260	1.184e-26	1.846e-260	8.118e-27
0.0318	1.819e+09	7.191e-33	3.304e-25	5.990e-35	2.752e-27
0.0322	3.356e+09	1.411e-31	6.334e-25	1.136e-33	5.098e-27
0.0364	1.221e+09	4.059e-23	1.279e-22	2.306e-25	7.265e-25
0.6616	7.905e+10	6.685e+02	3.639e+03	1.296e+00	7.055e+00
0.6938	6.880e+04	6.492e-04	3.395e-03	1.253e-06	6.554e-06
1.1732	4.218e+08	1.282e+01	4.417e+01	2.291e-02	7.894e-02
1.3325	4.218e+08	1.679e+01	5.284e+01	2.913e-02	9.167e-02
Totals	8.720e+10	6.981e+02	3.736e+03	1.348e+00	7.226e+00

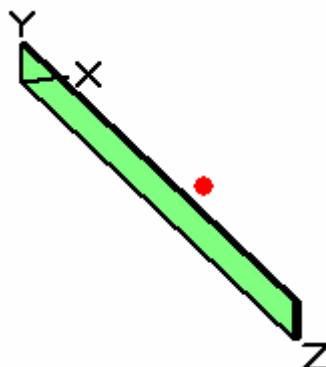
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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	12.7 cm 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	102.87 cm 3 ft 4.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	4.752e-255	3.196e-25	3.257e-255	2.190e-25
0.0318	1.819e+09	2.783e-30	4.959e-24	2.318e-32	4.131e-26
0.0322	3.356e+09	5.230e-29	9.297e-24	4.209e-31	7.482e-26
0.0364	1.221e+09	9.831e-21	1.150e-20	5.586e-23	6.531e-23
0.6616	7.905e+10	3.366e+04	9.509e+04	6.525e+01	1.844e+02
0.6938	6.880e+04	3.193e-02	8.873e-02	6.164e-05	1.713e-04
1.1732	4.218e+08	4.985e+02	1.138e+03	8.908e-01	2.033e+00
1.3325	4.218e+08	6.214e+02	1.352e+03	1.078e+00	2.346e+00
Totals	8.720e+10	3.478e+04	9.758e+04	6.721e+01	1.887e+02

Results - Dose Point # 2 - (40.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	6.325e-249	4.946e-26	4.335e-249	3.390e-26
0.0318	1.819e+09	2.255e-30	7.675e-25	1.879e-32	6.393e-27
0.0322	3.356e+09	4.142e-29	1.439e-24	3.333e-31	1.158e-26
0.0364	1.221e+09	6.939e-21	8.110e-21	3.942e-23	4.608e-23
0.6616	7.905e+10	1.294e+04	3.129e+04	2.509e+01	6.065e+01
0.6938	6.880e+04	1.219e-02	2.896e-02	2.353e-05	5.591e-05
1.1732	4.218e+08	1.746e+02	3.414e+02	3.121e-01	6.100e-01
1.3325	4.218e+08	2.131e+02	3.982e+02	3.697e-01	6.908e-01
Totals	8.720e+10	1.333e+04	3.202e+04	2.577e+01	6.195e+01

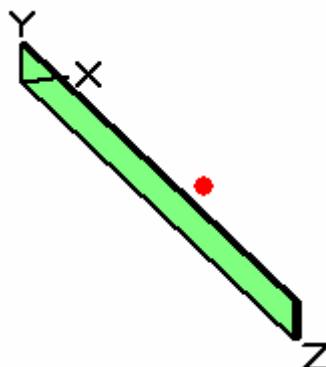
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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	12.7 cm 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	102.87 cm 3 ft 4.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	4.752e-255	5.893e-25	3.257e-255	4.039e-25
0.0318	1.819e+09	2.783e-30	3.248e-22	2.318e-32	2.705e-24
0.0322	3.356e+09	5.230e-29	6.515e-22	4.209e-31	5.243e-24
0.0364	1.221e+09	9.831e-21	1.246e-18	5.586e-23	7.081e-21
0.6616	7.905e+10	3.366e+04	1.326e+05	6.525e+01	2.570e+02
0.6938	6.880e+04	3.193e-02	1.214e-01	6.164e-05	2.343e-04
1.1732	4.218e+08	4.985e+02	1.347e+03	8.908e-01	2.407e+00
1.3325	4.218e+08	6.214e+02	1.564e+03	1.078e+00	2.714e+00
Totals	8.720e+10	3.478e+04	1.355e+05	6.721e+01	2.621e+02

Results - Dose Point # 2 - (40.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	6.325e-249	9.120e-26	4.335e-249	6.251e-26
0.0318	1.819e+09	2.255e-30	5.026e-23	1.879e-32	4.187e-25
0.0322	3.356e+09	4.142e-29	1.008e-22	3.333e-31	8.115e-25
0.0364	1.221e+09	6.939e-21	8.785e-19	3.942e-23	4.991e-21
0.6616	7.905e+10	1.294e+04	4.063e+04	2.509e+01	7.877e+01
0.6938	6.880e+04	1.219e-02	3.700e-02	2.353e-05	7.144e-05
1.1732	4.218e+08	1.746e+02	3.885e+02	3.121e-01	6.943e-01
1.3325	4.218e+08	2.131e+02	4.448e+02	3.697e-01	7.717e-01
Totals	8.720e+10	1.333e+04	4.146e+04	2.577e+01	8.023e+01

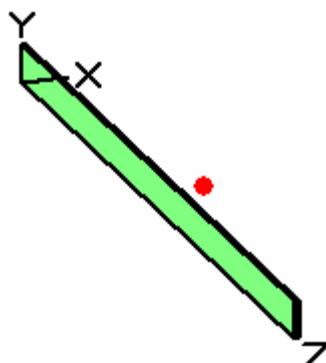
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File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.964e-25	0.000e+00	2.032e-25
0.0318	1.819e+09	4.894e-187	4.600e-24	4.077e-189	3.832e-26
0.0322	3.356e+09	6.111e-181	8.623e-24	4.918e-183	6.940e-26
0.0364	1.221e+09	2.089e-130	3.780e-24	1.187e-132	2.147e-26
0.6616	7.905e+10	3.877e+03	1.935e+04	7.517e+00	3.751e+01
0.6938	6.880e+04	4.060e-03	1.947e-02	7.839e-06	3.759e-05
1.1732	4.218e+08	1.269e+02	4.157e+02	2.268e-01	7.429e-01
1.3325	4.218e+08	1.735e+02	5.266e+02	3.010e-01	9.135e-01
Totals	8.720e+10	4.178e+03	2.029e+04	8.045e+00	3.917e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	4.881e-26	0.000e+00	3.345e-26
0.0318	1.819e+09	2.527e-186	7.574e-25	2.105e-188	6.309e-27
0.0322	3.356e+09	2.796e-180	1.420e-24	2.250e-182	1.143e-26
0.0364	1.221e+09	3.635e-130	6.223e-25	2.065e-132	3.536e-27
0.6616	7.905e+10	2.044e+03	9.097e+03	3.963e+00	1.764e+01
0.6938	6.880e+04	2.109e-03	8.999e-03	4.072e-06	1.737e-05
1.1732	4.218e+08	5.737e+01	1.652e+02	1.025e-01	2.952e-01
1.3325	4.218e+08	7.628e+01	2.035e+02	1.323e-01	3.530e-01
Totals	8.720e+10	2.178e+03	9.466e+03	4.197e+00	1.828e+01

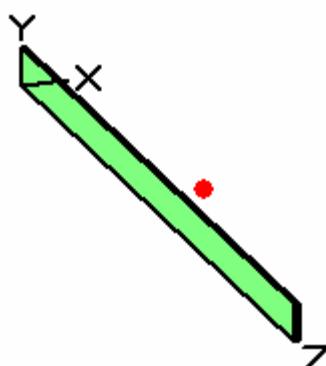
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Run Time : 8:40:29 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.935e-25	0.000e+00	2.012e-25
0.0318	1.819e+09	4.894e-187	4.306e-24	4.077e-189	3.587e-26
0.0322	3.356e+09	6.111e-181	8.047e-24	4.918e-183	6.476e-26
0.0364	1.221e+09	2.089e-130	3.350e-24	1.187e-132	1.903e-26
0.6616	7.905e+10	3.877e+03	6.760e+03	7.517e+00	1.311e+01
0.6938	6.880e+04	4.060e-03	7.151e-03	7.839e-06	1.381e-05
1.1732	4.218e+08	1.269e+02	2.340e+02	2.268e-01	4.181e-01
1.3325	4.218e+08	1.735e+02	3.161e+02	3.010e-01	5.485e-01
Totals	8.720e+10	4.178e+03	7.311e+03	8.045e+00	1.407e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	4.832e-26	0.000e+00	3.312e-26
0.0318	1.819e+09	2.527e-186	7.090e-25	2.105e-188	5.906e-27
0.0322	3.356e+09	2.796e-180	1.325e-24	2.250e-182	1.066e-26
0.0364	1.221e+09	3.635e-130	5.516e-25	2.065e-132	3.134e-27
0.6616	7.905e+10	2.044e+03	3.456e+03	3.963e+00	6.699e+00
0.6938	6.880e+04	2.109e-03	3.594e-03	4.072e-06	6.939e-06
1.1732	4.218e+08	5.737e+01	9.970e+01	1.025e-01	1.782e-01
1.3325	4.218e+08	7.628e+01	1.303e+02	1.323e-01	2.260e-01
Totals	8.720e+10	2.178e+03	3.686e+03	4.197e+00	7.104e+00

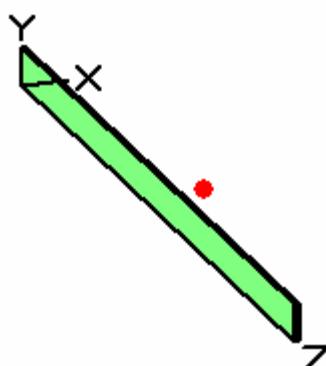
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Run Time : 8:40:55 PM
Duration : 00:00:26

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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	5.466e-25	0.000e+00	3.746e-25
0.0318	1.819e+09	4.894e-187	3.012e-22	4.077e-189	2.509e-24
0.0322	3.356e+09	6.111e-181	6.043e-22	4.918e-183	4.863e-24
0.0364	1.221e+09	2.089e-130	5.358e-22	1.187e-132	3.044e-24
0.6616	7.905e+10	3.877e+03	3.253e+04	7.517e+00	6.306e+01
0.6938	6.880e+04	4.060e-03	3.165e-02	7.839e-06	6.111e-05
1.1732	4.218e+08	1.269e+02	5.288e+02	2.268e-01	9.450e-01
1.3325	4.218e+08	1.735e+02	6.469e+02	3.010e-01	1.122e+00
Totals	8.720e+10	4.178e+03	3.371e+04	8.045e+00	6.513e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	9.000e-26	0.000e+00	6.169e-26
0.0318	1.819e+09	2.527e-186	4.960e-23	2.105e-188	4.131e-25
0.0322	3.356e+09	2.796e-180	9.950e-23	2.250e-182	8.008e-25
0.0364	1.221e+09	3.635e-130	8.822e-23	2.065e-132	5.012e-25
0.6616	7.905e+10	2.044e+03	1.471e+04	3.963e+00	2.852e+01
0.6938	6.880e+04	2.109e-03	1.409e-02	4.072e-06	2.720e-05
1.1732	4.218e+08	5.737e+01	2.048e+02	1.025e-01	3.660e-01
1.3325	4.218e+08	7.628e+01	2.443e+02	1.323e-01	4.239e-01
Totals	8.720e+10	2.178e+03	1.516e+04	4.197e+00	2.931e+01

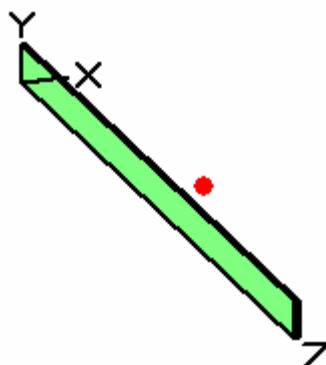
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Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	13.97 cm 5.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	104.14 cm 3 ft 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.258e-25	0.000e+00	2.233e-25
0.0318	1.819e+09	4.894e-187	9.087e-24	4.077e-189	7.569e-26
0.0322	3.356e+09	6.111e-181	1.742e-23	4.918e-183	1.402e-25
0.0364	1.221e+09	2.089e-130	9.709e-24	1.187e-132	5.516e-26
0.6616	7.905e+10	3.877e+03	2.565e+04	7.517e+00	4.972e+01
0.6938	6.880e+04	4.060e-03	2.533e-02	7.839e-06	4.891e-05
1.1732	4.218e+08	1.269e+02	4.727e+02	2.268e-01	8.448e-01
1.3325	4.218e+08	1.735e+02	5.876e+02	3.010e-01	1.019e+00
Totals	8.720e+10	4.178e+03	2.671e+04	8.045e+00	5.159e+01

Results - Dose Point # 2 - (41,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	5.364e-26	0.000e+00	3.677e-26
0.0318	1.819e+09	2.527e-186	1.496e-24	2.105e-188	1.246e-26
0.0322	3.356e+09	2.796e-180	2.869e-24	2.250e-182	2.309e-26
0.0364	1.221e+09	3.635e-130	1.599e-24	2.065e-132	9.083e-27
0.6616	7.905e+10	2.044e+03	1.182e+04	3.963e+00	2.291e+01
0.6938	6.880e+04	2.109e-03	1.148e-02	4.072e-06	2.217e-05
1.1732	4.218e+08	5.737e+01	1.855e+02	1.025e-01	3.315e-01
1.3325	4.218e+08	7.628e+01	2.246e+02	1.323e-01	3.897e-01
Totals	8.720e+10	2.178e+03	1.223e+04	4.197e+00	2.363e+01

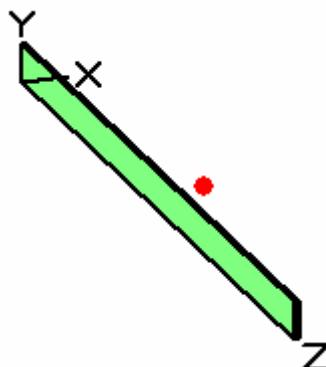
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Duration : 00:00:26

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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at bottom of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	12.7 cm 5.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	102.87 cm 3 ft 4.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	4.752e-255	3.512e-25	3.257e-255	2.407e-25
0.0318	1.819e+09	2.783e-30	9.797e-24	2.318e-32	8.160e-26
0.0322	3.356e+09	5.230e-29	1.878e-23	4.209e-31	1.512e-25
0.0364	1.221e+09	9.831e-21	3.105e-20	5.586e-23	1.764e-22
0.6616	7.905e+10	3.366e+04	1.144e+05	6.525e+01	2.218e+02
0.6938	6.880e+04	3.193e-02	1.056e-01	6.164e-05	2.039e-04
1.1732	4.218e+08	4.985e+02	1.248e+03	8.908e-01	2.229e+00
1.3325	4.218e+08	6.214e+02	1.464e+03	1.078e+00	2.540e+00
Totals	8.720e+10	3.478e+04	1.171e+05	6.721e+01	2.266e+02

Results - Dose Point # 2 - (40.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	6.325e-249	5.435e-26	4.335e-249	3.726e-26
0.0318	1.819e+09	2.255e-30	1.516e-24	1.879e-32	1.263e-26
0.0322	3.356e+09	4.142e-29	2.907e-24	3.333e-31	2.339e-26
0.0364	1.221e+09	6.939e-21	2.190e-20	3.942e-23	1.244e-22
0.6616	7.905e+10	1.294e+04	3.632e+04	2.509e+01	7.042e+01
0.6938	6.880e+04	1.219e-02	3.331e-02	2.353e-05	6.430e-05
1.1732	4.218e+08	1.746e+02	3.669e+02	3.121e-01	6.556e-01
1.3325	4.218e+08	2.131e+02	4.234e+02	3.697e-01	7.345e-01
Totals	8.720e+10	1.333e+04	3.711e+04	2.577e+01	7.181e+01

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DOS File :v14_endoftank.ms6
Run Date : March 3, 2004
Run Time : 8:42:14 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1769.11 cm 58 ft 0.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	1.197e-252	1.704e-25	8.204e-253	1.168e-25
0.0318	1.819e+09	2.424e-30	2.644e-24	2.019e-32	2.202e-26
0.0322	3.356e+09	4.524e-29	4.957e-24	3.641e-31	3.989e-26
0.0364	1.221e+09	8.310e-21	9.715e-21	4.722e-23	5.520e-23
0.6616	7.905e+10	2.636e+04	7.000e+04	5.110e+01	1.357e+02
0.6938	6.880e+04	2.492e-02	6.511e-02	4.812e-05	1.257e-04
1.1732	4.218e+08	3.756e+02	8.086e+02	6.713e-01	1.445e+00
1.3325	4.218e+08	4.644e+02	9.544e+02	8.056e-01	1.656e+00
Totals	8.720e+10	2.720e+04	7.177e+04	5.257e+01	1.388e+02

Results - Dose Point # 2 - (696.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.968e-249	1.711e-26	2.035e-249	1.173e-26
0.0318	1.819e+09	7.828e-31	2.655e-25	6.520e-33	2.212e-27
0.0322	3.356e+09	1.415e-29	4.978e-25	1.139e-31	4.006e-27
0.0364	1.221e+09	2.012e-21	2.350e-21	1.143e-23	1.335e-23
0.6616	7.905e+10	1.125e+03	2.985e+03	2.181e+00	5.787e+00
0.6938	6.880e+04	1.063e-03	2.781e-03	2.053e-06	5.369e-06
1.1732	4.218e+08	1.606e+01	3.543e+01	2.870e-02	6.332e-02
1.3325	4.218e+08	1.992e+01	4.217e+01	3.456e-02	7.315e-02
Totals	8.720e+10	1.161e+03	3.063e+03	2.245e+00	5.924e+00

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DOS File :v14_endoftank_a.ms6
Run Date : March 3, 2004
Run Time : 8:42:40 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1769.11 cm 58 ft 0.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	1.197e-252	3.142e-25	8.204e-253	2.153e-25
0.0318	1.819e+09	2.424e-30	1.731e-22	2.019e-32	1.442e-24
0.0322	3.356e+09	4.524e-29	3.474e-22	3.641e-31	2.795e-24
0.0364	1.221e+09	8.310e-21	1.055e-18	4.722e-23	5.993e-21
0.6616	7.905e+10	2.636e+04	9.508e+04	5.110e+01	1.843e+02
0.6938	6.880e+04	2.492e-02	8.687e-02	4.812e-05	1.677e-04
1.1732	4.218e+08	3.756e+02	9.441e+02	6.713e-01	1.687e+00
1.3325	4.218e+08	4.644e+02	1.091e+03	8.056e-01	1.892e+00
Totals	8.720e+10	2.720e+04	9.712e+04	5.257e+01	1.879e+02

Results - Dose Point # 2 - (696.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.968e-249	3.155e-26	2.035e-249	2.163e-26
0.0318	1.819e+09	7.828e-31	1.739e-23	6.520e-33	1.448e-25
0.0322	3.356e+09	1.415e-29	3.488e-23	1.139e-31	2.807e-25
0.0364	1.221e+09	2.012e-21	2.514e-19	1.143e-23	1.428e-21
0.6616	7.905e+10	1.125e+03	4.091e+03	2.181e+00	7.930e+00
0.6938	6.880e+04	1.063e-03	3.744e-03	2.053e-06	7.229e-06
1.1732	4.218e+08	1.606e+01	4.173e+01	2.870e-02	7.458e-02
1.3325	4.218e+08	1.992e+01	4.859e+01	3.456e-02	8.430e-02
Totals	8.720e+10	1.161e+03	4.181e+03	2.245e+00	8.089e+00

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DOS File :v14_endoftank_pb.ms6
Run Date : March 3, 2004
Run Time : 8:43:07 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1770.38 cm 58 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.511e-25	0.000e+00	1.036e-25
0.0318	1.819e+09	7.737e-187	2.345e-24	6.444e-189	1.954e-26
0.0322	3.356e+09	9.290e-181	4.397e-24	7.476e-183	3.539e-26
0.0364	1.221e+09	2.321e-130	1.927e-24	1.319e-132	1.095e-26
0.6616	7.905e+10	3.540e+03	1.723e+04	6.863e+00	3.340e+01
0.6938	6.880e+04	3.680e-03	1.718e-02	7.105e-06	3.317e-05
1.1732	4.218e+08	1.078e+02	3.407e+02	1.926e-01	6.088e-01
1.3325	4.218e+08	1.457e+02	4.265e+02	2.528e-01	7.399e-01
Totals	8.720e+10	3.794e+03	1.799e+04	7.308e+00	3.474e+01

Results - Dose Point # 2 - (697,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.688e-26	0.000e+00	1.157e-26
0.0318	1.819e+09	1.847e-186	2.619e-25	1.539e-188	2.182e-27
0.0322	3.356e+09	2.022e-180	4.910e-25	1.627e-182	3.951e-27
0.0364	1.221e+09	2.336e-130	2.152e-25	1.327e-132	1.223e-27
0.6616	7.905e+10	2.354e+02	1.086e+03	4.563e-01	2.106e+00
0.6938	6.880e+04	2.416e-04	1.072e-03	4.665e-07	2.070e-06
1.1732	4.218e+08	6.483e+00	1.999e+01	1.159e-02	3.573e-02
1.3325	4.218e+08	8.684e+00	2.493e+01	1.507e-02	4.325e-02
Totals	8.720e+10	2.506e+02	1.131e+03	4.830e-01	2.185e+00

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DOS File :v14_endoftank_pb_2.ms6
Run Date : March 3, 2004
Run Time : 8:43:33 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1770.38 cm 58 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.496e-25	0.000e+00	1.026e-25
0.0318	1.819e+09	7.737e-187	2.196e-24	6.444e-189	1.829e-26
0.0322	3.356e+09	9.290e-181	4.103e-24	7.476e-183	3.302e-26
0.0364	1.221e+09	2.321e-130	1.708e-24	1.319e-132	9.706e-27
0.6616	7.905e+10	3.540e+03	6.131e+03	6.863e+00	1.189e+01
0.6938	6.880e+04	3.680e-03	6.433e-03	7.105e-06	1.242e-05
1.1732	4.218e+08	1.078e+02	1.954e+02	1.926e-01	3.493e-01
1.3325	4.218e+08	1.457e+02	2.607e+02	2.528e-01	4.523e-01
Totals	8.720e+10	3.794e+03	6.587e+03	7.308e+00	1.269e+01

Results - Dose Point # 2 - (697,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.671e-26	0.000e+00	1.145e-26
0.0318	1.819e+09	1.847e-186	2.452e-25	1.539e-188	2.042e-27
0.0322	3.356e+09	2.022e-180	4.582e-25	1.627e-182	3.687e-27
0.0364	1.221e+09	2.336e-130	1.907e-25	1.327e-132	1.084e-27
0.6616	7.905e+10	2.354e+02	4.007e+02	4.563e-01	7.768e-01
0.6938	6.880e+04	2.416e-04	4.150e-04	4.665e-07	8.013e-07
1.1732	4.218e+08	6.483e+00	1.159e+01	1.159e-02	2.072e-02
1.3325	4.218e+08	8.684e+00	1.535e+01	1.507e-02	2.663e-02
Totals	8.720e+10	2.506e+02	4.276e+02	4.830e-01	8.241e-01

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DOS File :v14_endoftank_pb_a.ms6
Run Date : March 3, 2004
Run Time : 8:44:00 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1770.38 cm 58 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.787e-25	0.000e+00	1.910e-25
0.0318	1.819e+09	7.737e-187	1.536e-22	6.444e-189	1.279e-24
0.0322	3.356e+09	9.290e-181	3.081e-22	7.476e-183	2.480e-24
0.0364	1.221e+09	2.321e-130	2.732e-22	1.319e-132	1.552e-24
0.6616	7.905e+10	3.540e+03	2.871e+04	6.863e+00	5.567e+01
0.6938	6.880e+04	3.680e-03	2.769e-02	7.105e-06	5.347e-05
1.1732	4.218e+08	1.078e+02	4.304e+02	1.926e-01	7.691e-01
1.3325	4.218e+08	1.457e+02	5.207e+02	2.528e-01	9.035e-01
Totals	8.720e+10	3.794e+03	2.967e+04	7.308e+00	5.734e+01

Results - Dose Point # 2 - (697,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.112e-26	0.000e+00	2.133e-26
0.0318	1.819e+09	1.847e-186	1.715e-23	1.539e-188	1.429e-25
0.0322	3.356e+09	2.022e-180	3.441e-23	1.627e-182	2.769e-25
0.0364	1.221e+09	2.336e-130	3.050e-23	1.327e-132	1.733e-25
0.6616	7.905e+10	2.354e+02	1.785e+03	4.563e-01	3.461e+00
0.6938	6.880e+04	2.416e-04	1.706e-03	4.665e-07	3.294e-06
1.1732	4.218e+08	6.483e+00	2.515e+01	1.159e-02	4.495e-02
1.3325	4.218e+08	8.684e+00	3.034e+01	1.507e-02	5.265e-02
Totals	8.720e+10	2.506e+02	1.841e+03	4.830e-01	3.558e+00

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DOS File :v14_endoftank_pb_s.ms6
Run Date : March 3, 2004
Run Time : 8:44:26 PM
Duration : 00:00:27

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank with lead shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1680.21 cm 55 ft 1.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1770.38 cm 58 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.661e-25	0.000e+00	1.139e-25
0.0318	1.819e+09	7.737e-187	4.633e-24	6.444e-189	3.859e-26
0.0322	3.356e+09	9.290e-181	8.883e-24	7.476e-183	7.149e-26
0.0364	1.221e+09	2.321e-130	4.950e-24	1.319e-132	2.813e-26
0.6616	7.905e+10	3.540e+03	2.273e+04	6.863e+00	4.407e+01
0.6938	6.880e+04	3.680e-03	2.226e-02	7.105e-06	4.297e-05
1.1732	4.218e+08	1.078e+02	3.861e+02	1.926e-01	6.899e-01
1.3325	4.218e+08	1.457e+02	4.745e+02	2.528e-01	8.232e-01
Totals	8.720e+10	3.794e+03	2.359e+04	7.308e+00	4.558e+01

Results - Dose Point # 2 - (697,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.855e-26	0.000e+00	1.271e-26
0.0318	1.819e+09	1.847e-186	5.173e-25	1.539e-188	4.309e-27
0.0322	3.356e+09	2.022e-180	9.919e-25	1.627e-182	7.983e-27
0.0364	1.221e+09	2.336e-130	5.528e-25	1.327e-132	3.141e-27
0.6616	7.905e+10	2.354e+02	1.423e+03	4.563e-01	2.759e+00
0.6938	6.880e+04	2.416e-04	1.380e-03	4.665e-07	2.664e-06
1.1732	4.218e+08	6.483e+00	2.261e+01	1.159e-02	4.041e-02
1.3325	4.218e+08	8.684e+00	2.770e+01	1.507e-02	4.806e-02
Totals	8.720e+10	2.506e+02	1.473e+03	4.830e-01	2.847e+00

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DOS File :v14_endoftank_s.ms6
Run Date : March 3, 2004
Run Time : 8:44:53 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at end of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	1.7e+3 cm	(55 ft 0.0 in)
Width	82.245 cm	(2 ft 8.4 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	1678.94 cm 55 ft 1.0 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in
# 2	1769.11 cm 58 ft 0.5 in	5.08 cm 2.0 in	41.148 cm 1 ft 4.2 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	100
Y Direction	20
Z Direction	20

Results - Dose Point # 1 - (661,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	1.197e-252	1.873e-25	8.204e-253	1.283e-25
0.0318	1.819e+09	2.424e-30	5.223e-24	2.019e-32	4.351e-26
0.0322	3.356e+09	4.524e-29	1.001e-23	3.641e-31	8.059e-26
0.0364	1.221e+09	8.310e-21	2.624e-20	4.722e-23	1.491e-22
0.6616	7.905e+10	2.636e+04	8.312e+04	5.110e+01	1.611e+02
0.6938	6.880e+04	2.492e-02	7.652e-02	4.812e-05	1.477e-04
1.1732	4.218e+08	3.756e+02	8.802e+02	6.713e-01	1.573e+00
1.3325	4.218e+08	4.644e+02	1.027e+03	8.056e-01	1.781e+00
Totals	8.720e+10	2.720e+04	8.502e+04	5.257e+01	1.645e+02

Results - Dose Point # 2 - (696.5,2,16.2) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.968e-249	1.880e-26	2.035e-249	1.289e-26
0.0318	1.819e+09	7.828e-31	5.245e-25	6.520e-33	4.369e-27
0.0322	3.356e+09	1.415e-29	1.006e-24	1.139e-31	8.093e-27
0.0364	1.221e+09	2.012e-21	6.350e-21	1.143e-23	3.608e-23
0.6616	7.905e+10	1.125e+03	3.557e+03	2.181e+00	6.895e+00
0.6938	6.880e+04	1.063e-03	3.280e-03	2.053e-06	6.333e-06
1.1732	4.218e+08	1.606e+01	3.872e+01	2.870e-02	6.920e-02
1.3325	4.218e+08	1.992e+01	4.552e+01	3.456e-02	7.897e-02
Totals	8.720e+10	1.161e+03	3.641e+03	2.245e+00	7.043e+00

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Run Time : 8:45:19 PM
Duration : 00:00:26

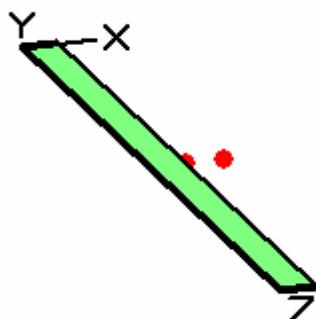
File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14

Description: Dose horizontal to the waste on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	84.7852 cm 2 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	174.9552 cm 5 ft 8.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	9.621e-252	2.120e-25	6.595e-252	1.453e-25
0.0318	1.819e+09	2.646e-30	3.290e-24	2.204e-32	2.740e-26
0.0322	3.356e+09	4.900e-29	6.168e-24	3.943e-31	4.964e-26
0.0364	1.221e+09	8.451e-21	9.879e-21	4.801e-23	5.613e-23
0.6616	7.905e+10	2.639e+04	7.030e+04	5.116e+01	1.363e+02
0.6938	6.880e+04	2.496e-02	6.542e-02	4.818e-05	1.263e-04
1.1732	4.218e+08	3.770e+02	8.172e+02	6.737e-01	1.460e+00
1.3325	4.218e+08	4.665e+02	9.666e+02	8.093e-01	1.677e+00
Totals	8.720e+10	2.723e+04	7.209e+04	5.264e+01	1.394e+02

Results - Dose Point # 2 - (68.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.309e-249	3.746e-26	1.583e-249	2.567e-26
0.0318	1.819e+09	7.830e-31	5.813e-25	6.522e-33	4.842e-27
0.0322	3.356e+09	1.416e-29	1.090e-24	1.139e-31	8.770e-27
0.0364	1.221e+09	2.018e-21	2.358e-21	1.147e-23	1.340e-23
0.6616	7.905e+10	2.428e+03	7.117e+03	4.707e+00	1.380e+01
0.6938	6.880e+04	2.306e-03	6.664e-03	4.452e-06	1.287e-05
1.1732	4.218e+08	3.686e+01	8.939e+01	6.587e-02	1.598e-01
1.3325	4.218e+08	4.636e+01	1.076e+02	8.043e-02	1.867e-01
Totals	8.720e+10	2.511e+03	7.314e+03	4.853e+00	1.414e+01

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Run Date : March 3, 2004
Run Time : 8:45:45 PM
Duration : 00:00:25

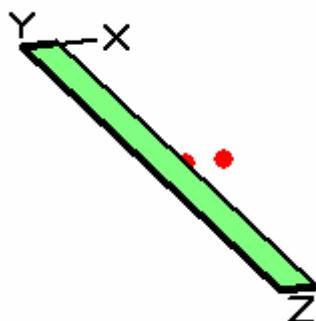
File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14

Description: Dose horizontal to the waste on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	84.7852 cm 2 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	174.9552 cm 5 ft 8.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	9.621e-252	3.909e-25	6.595e-252	2.679e-25
0.0318	1.819e+09	2.646e-30	2.154e-22	2.204e-32	1.795e-24
0.0322	3.356e+09	4.900e-29	4.322e-22	3.943e-31	3.478e-24
0.0364	1.221e+09	8.451e-21	1.068e-18	4.801e-23	6.070e-21
0.6616	7.905e+10	2.639e+04	9.569e+04	5.116e+01	1.855e+02
0.6938	6.880e+04	2.496e-02	8.745e-02	4.818e-05	1.688e-04
1.1732	4.218e+08	3.770e+02	9.561e+02	6.737e-01	1.709e+00
1.3325	4.218e+08	4.665e+02	1.107e+03	8.093e-01	1.920e+00
Totals	8.720e+10	2.723e+04	9.775e+04	5.264e+01	1.891e+02

Results - Dose Point # 2 - (68.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.309e-249	6.907e-26	1.583e-249	4.734e-26
0.0318	1.819e+09	7.830e-31	3.806e-23	6.522e-33	3.171e-25
0.0322	3.356e+09	1.416e-29	7.636e-23	1.139e-31	6.146e-25
0.0364	1.221e+09	2.018e-21	2.523e-19	1.147e-23	1.433e-21
0.6616	7.905e+10	2.428e+03	1.015e+04	4.707e+00	1.969e+01
0.6938	6.880e+04	2.306e-03	9.324e-03	4.452e-06	1.800e-05
1.1732	4.218e+08	3.686e+01	1.076e+02	6.587e-02	1.922e-01
1.3325	4.218e+08	4.636e+01	1.263e+02	8.043e-02	2.192e-01
Totals	8.720e+10	2.511e+03	1.039e+04	4.853e+00	2.010e+01

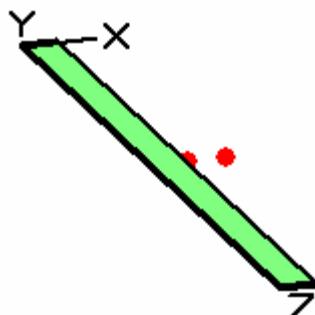
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DOS File :v14_horizontal_pb.ms6
Run Date : March 3, 2004
Run Time : 8:46:10 PM
Duration : 00:00:26

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose horizontal to the waste on side of tank with Pb shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	86.0552 cm 2 ft 9.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	176.2252 cm 5 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.924e-25	0.000e+00	1.319e-25
0.0318	1.819e+09	1.187e-186	2.986e-24	9.888e-189	2.488e-26
0.0322	3.356e+09	1.399e-180	5.599e-24	1.126e-182	4.506e-26
0.0364	1.221e+09	2.970e-130	2.454e-24	1.688e-132	1.394e-26
0.6616	7.905e+10	3.542e+03	1.725e+04	6.867e+00	3.345e+01
0.6938	6.880e+04	3.682e-03	1.721e-02	7.109e-06	3.323e-05
1.1732	4.218e+08	1.080e+02	3.428e+02	1.930e-01	6.125e-01
1.3325	4.218e+08	1.462e+02	4.298e+02	2.536e-01	7.456e-01
Totals	8.720e+10	3.796e+03	1.803e+04	7.314e+00	3.481e+01

Results - Dose Point # 2 - (69.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.704e-26	0.000e+00	2.539e-26
0.0318	1.819e+09	1.847e-186	5.748e-25	1.539e-188	4.788e-27
0.0322	3.356e+09	2.022e-180	1.078e-24	1.627e-182	8.672e-27
0.0364	1.221e+09	2.336e-130	4.723e-25	1.327e-132	2.684e-27
0.6616	7.905e+10	4.119e+02	2.091e+03	7.986e-01	4.053e+00
0.6938	6.880e+04	4.278e-04	2.091e-03	8.260e-07	4.036e-06
1.1732	4.218e+08	1.280e+01	4.352e+01	2.287e-02	7.778e-02
1.3325	4.218e+08	1.751e+01	5.537e+01	3.038e-02	9.606e-02
Totals	8.720e+10	4.422e+02	2.190e+03	8.518e-01	4.227e+00

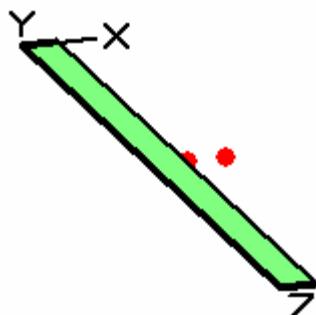
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Run Time : 8:46:36 PM
Duration : 00:00:25

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose horizontal to the waste on side of tank with Pb shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	86.0552 cm 2 ft 9.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	176.2252 cm 5 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	1.905e-25	0.000e+00	1.306e-25
0.0318	1.819e+09	1.187e-186	2.796e-24	9.888e-189	2.329e-26
0.0322	3.356e+09	1.399e-180	5.225e-24	1.126e-182	4.205e-26
0.0364	1.221e+09	2.970e-130	2.175e-24	1.688e-132	1.236e-26
0.6616	7.905e+10	3.542e+03	6.136e+03	6.867e+00	1.190e+01
0.6938	6.880e+04	3.682e-03	6.438e-03	7.109e-06	1.243e-05
1.1732	4.218e+08	1.080e+02	1.962e+02	1.930e-01	3.506e-01
1.3325	4.218e+08	1.462e+02	2.620e+02	2.536e-01	4.546e-01
Totals	8.720e+10	3.796e+03	6.594e+03	7.314e+00	1.270e+01

Results - Dose Point # 2 - (69.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.667e-26	0.000e+00	2.514e-26
0.0318	1.819e+09	1.847e-186	5.381e-25	1.539e-188	4.482e-27
0.0322	3.356e+09	2.022e-180	1.006e-24	1.627e-182	8.093e-27
0.0364	1.221e+09	2.336e-130	4.187e-25	1.327e-132	2.379e-27
0.6616	7.905e+10	4.119e+02	7.199e+02	7.986e-01	1.396e+00
0.6938	6.880e+04	4.278e-04	7.557e-04	8.260e-07	1.459e-06
1.1732	4.218e+08	1.280e+01	2.395e+01	2.287e-02	4.280e-02
1.3325	4.218e+08	1.751e+01	3.252e+01	3.038e-02	5.642e-02
Totals	8.720e+10	4.422e+02	7.764e+02	8.518e-01	1.495e+00

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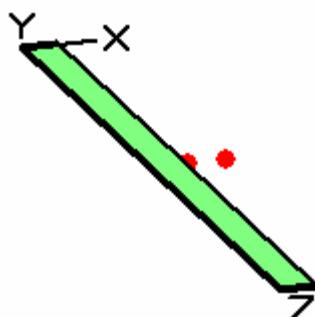
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Case Title: PM-2A V-14

Description: Dose horizontal to the waste on side of tank with Pb shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	86.0552 cm 2 ft 9.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	176.2252 cm 5 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	3.548e-25	0.000e+00	2.432e-25
0.0318	1.819e+09	1.187e-186	1.956e-22	9.888e-189	1.629e-24
0.0322	3.356e+09	1.399e-180	3.923e-22	1.126e-182	3.157e-24
0.0364	1.221e+09	2.970e-130	3.478e-22	1.688e-132	1.976e-24
0.6616	7.905e+10	3.542e+03	2.877e+04	6.867e+00	5.578e+01
0.6938	6.880e+04	3.682e-03	2.776e-02	7.109e-06	5.359e-05
1.1732	4.218e+08	1.080e+02	4.334e+02	1.930e-01	7.745e-01
1.3325	4.218e+08	1.462e+02	5.252e+02	2.536e-01	9.112e-01
Totals	8.720e+10	3.796e+03	2.973e+04	7.314e+00	5.747e+01

Results - Dose Point # 2 - (69.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	6.830e-26	0.000e+00	4.682e-26
0.0318	1.819e+09	1.847e-186	3.764e-23	1.539e-188	3.135e-25
0.0322	3.356e+09	2.022e-180	7.552e-23	1.627e-182	6.077e-25
0.0364	1.221e+09	2.336e-130	6.695e-23	1.327e-132	3.804e-25
0.6616	7.905e+10	4.119e+02	3.544e+03	7.986e-01	6.871e+00
0.6938	6.880e+04	4.278e-04	3.427e-03	8.260e-07	6.616e-06
1.1732	4.218e+08	1.280e+01	5.577e+01	2.287e-02	9.967e-02
1.3325	4.218e+08	1.751e+01	6.849e+01	3.038e-02	1.188e-01
Totals	8.720e+10	4.422e+02	3.669e+03	8.518e-01	7.090e+00

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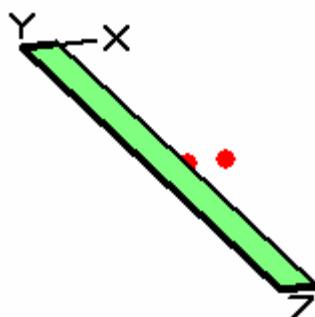
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Case Title: PM-2A V-14

Description: Dose horizontal to the waste on side of tank with Pb shield
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	86.0552 cm 2 ft 9.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	176.2252 cm 5 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Shield 2	.5 in	Lead	11.34
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	2.115e-25	0.000e+00	1.450e-25
0.0318	1.819e+09	1.187e-186	5.899e-24	9.888e-189	4.914e-26
0.0322	3.356e+09	1.399e-180	1.131e-23	1.126e-182	9.103e-26
0.0364	1.221e+09	2.970e-130	6.303e-24	1.688e-132	3.581e-26
0.6616	7.905e+10	3.542e+03	2.278e+04	6.867e+00	4.415e+01
0.6938	6.880e+04	3.682e-03	2.230e-02	7.109e-06	4.306e-05
1.1732	4.218e+08	1.080e+02	3.886e+02	1.930e-01	6.945e-01
1.3325	4.218e+08	1.462e+02	4.784e+02	2.536e-01	8.299e-01
Totals	8.720e+10	3.796e+03	2.364e+04	7.314e+00	4.568e+01

Results - Dose Point # 2 - (69.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	0.000e+00	4.071e-26	0.000e+00	2.790e-26
0.0318	1.819e+09	1.847e-186	1.136e-24	1.539e-188	9.458e-27
0.0322	3.356e+09	2.022e-180	2.177e-24	1.627e-182	1.752e-26
0.0364	1.221e+09	2.336e-130	1.213e-24	1.327e-132	6.893e-27
0.6616	7.905e+10	4.119e+02	2.783e+03	7.986e-01	5.396e+00
0.6938	6.880e+04	4.278e-04	2.732e-03	8.260e-07	5.274e-06
1.1732	4.218e+08	1.280e+01	4.968e+01	2.287e-02	8.878e-02
1.3325	4.218e+08	1.751e+01	6.200e+01	3.038e-02	1.076e-01
Totals	8.720e+10	4.422e+02	2.895e+03	8.518e-01	5.592e+00

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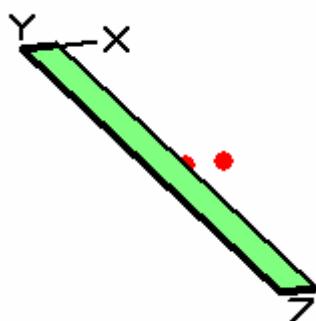
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Case Title: PM-2A V-14

Description: Dose horizontal to the waste on side of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	82.245 cm	(2 ft 8.4 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	10.16 cm	(4.0 in)



Dose Points

A	X	Y	Z
# 1	84.7852 cm 2 ft 9.4 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in
# 2	174.9552 cm 5 ft 8.9 in	5.08 cm 2.0 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (33.38,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	9.621e-252	2.330e-25	6.595e-252	1.597e-25
0.0318	1.819e+09	2.646e-30	6.499e-24	2.204e-32	5.413e-26
0.0322	3.356e+09	4.900e-29	1.246e-23	3.943e-31	1.003e-25
0.0364	1.221e+09	8.451e-21	2.668e-20	4.801e-23	1.516e-22
0.6616	7.905e+10	2.639e+04	8.356e+04	5.116e+01	1.620e+02
0.6938	6.880e+04	2.496e-02	7.695e-02	4.818e-05	1.486e-04
1.1732	4.218e+08	3.770e+02	8.906e+02	6.737e-01	1.591e+00
1.3325	4.218e+08	4.665e+02	1.041e+03	8.093e-01	1.806e+00
Totals	8.720e+10	2.723e+04	8.549e+04	5.264e+01	1.654e+02

Results - Dose Point # 2 - (68.88,2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.309e-249	4.117e-26	1.583e-249	2.822e-26
0.0318	1.819e+09	7.830e-31	1.148e-24	6.522e-33	9.565e-27
0.0322	3.356e+09	1.416e-29	2.202e-24	1.139e-31	1.772e-26
0.0364	1.221e+09	2.018e-21	6.371e-21	1.147e-23	3.620e-23
0.6616	7.905e+10	2.428e+03	8.658e+03	4.707e+00	1.679e+01
0.6938	6.880e+04	2.306e-03	8.018e-03	4.452e-06	1.548e-05
1.1732	4.218e+08	3.686e+01	9.879e+01	6.587e-02	1.765e-01
1.3325	4.218e+08	4.636e+01	1.173e+02	8.043e-02	2.035e-01
Totals	8.720e+10	2.511e+03	8.874e+03	4.853e+00	1.717e+01

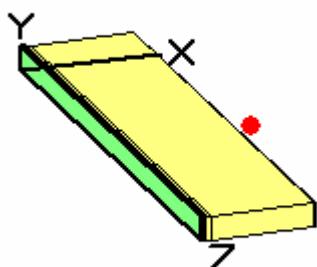
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Duration : 00:00:25

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	137.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 1
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.638e-260	2.009e-26	1.808e-260	1.377e-26
0.0318	1.819e+09	7.020e-33	1.405e-23	5.847e-35	1.170e-25
0.0322	3.356e+09	1.377e-31	2.842e-23	1.109e-33	2.287e-25
0.0364	1.221e+09	3.956e-23	7.636e-21	2.248e-25	4.339e-23
0.6616	7.905e+10	6.496e+02	4.422e+03	1.259e+00	8.573e+00
0.6938	6.880e+04	6.308e-04	4.072e-03	1.218e-06	7.863e-06
1.1732	4.218e+08	1.245e+01	4.786e+01	2.225e-02	8.553e-02
1.3325	4.218e+08	1.631e+01	5.635e+01	2.830e-02	9.777e-02
Totals	8.720e+10	6.783e+02	4.526e+03	1.310e+00	8.756e+00

Results - Dose Point # 2 - (186,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.177e-260	1.501e-26	1.492e-260	1.029e-26
0.0318	1.819e+09	5.737e-33	1.050e-23	4.779e-35	8.745e-26
0.0322	3.356e+09	1.125e-31	2.124e-23	9.053e-34	1.709e-25
0.0364	1.221e+09	3.207e-23	6.188e-21	1.822e-25	3.516e-23
0.6616	7.905e+10	5.172e+02	3.502e+03	1.003e+00	6.789e+00
0.6938	6.880e+04	5.021e-04	3.224e-03	9.695e-07	6.224e-06
1.1732	4.218e+08	9.880e+00	3.768e+01	1.766e-02	6.733e-02
1.3325	4.218e+08	1.293e+01	4.430e+01	2.243e-02	7.685e-02
Totals	8.720e+10	5.400e+02	3.584e+03	1.043e+00	6.933e+00

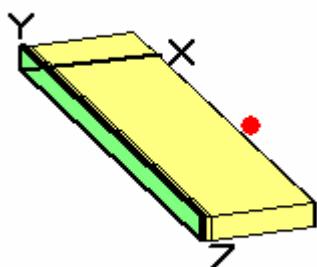
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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	137.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 2
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.638e-260	1.916e-26	1.808e-260	1.313e-26
0.0318	1.819e+09	7.020e-33	1.056e-23	5.847e-35	8.796e-26
0.0322	3.356e+09	1.377e-31	2.118e-23	1.109e-33	1.705e-25
0.0364	1.221e+09	3.956e-23	5.590e-21	2.248e-25	3.176e-23
0.6616	7.905e+10	6.496e+02	4.363e+03	1.259e+00	8.458e+00
0.6938	6.880e+04	6.308e-04	4.022e-03	1.218e-06	7.766e-06
1.1732	4.218e+08	1.245e+01	4.761e+01	2.225e-02	8.509e-02
1.3325	4.218e+08	1.631e+01	5.612e+01	2.830e-02	9.737e-02
Totals	8.720e+10	6.783e+02	4.467e+03	1.310e+00	8.641e+00

Results - Dose Point # 2 - (186,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.177e-260	1.432e-26	1.492e-260	9.815e-27
0.0318	1.819e+09	5.737e-33	7.892e-24	4.779e-35	6.574e-26
0.0322	3.356e+09	1.125e-31	1.583e-23	9.053e-34	1.274e-25
0.0364	1.221e+09	3.207e-23	4.530e-21	1.822e-25	2.574e-23
0.6616	7.905e+10	5.172e+02	3.455e+03	1.003e+00	6.699e+00
0.6938	6.880e+04	5.021e-04	3.184e-03	9.695e-07	6.148e-06
1.1732	4.218e+08	9.880e+00	3.749e+01	1.766e-02	6.699e-02
1.3325	4.218e+08	1.293e+01	4.411e+01	2.243e-02	7.653e-02
Totals	8.720e+10	5.400e+02	3.537e+03	1.043e+00	6.842e+00

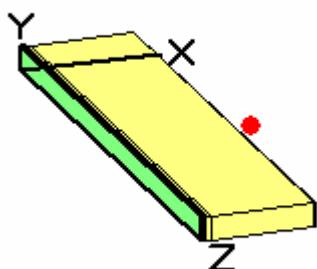
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Duration : 00:00:25

File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	137.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Shield 3
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.638e-260	1.039e-26	1.808e-260	7.123e-27
0.0318	1.819e+09	7.020e-33	1.613e-25	5.847e-35	1.343e-27
0.0322	3.356e+09	1.377e-31	3.023e-25	1.109e-33	2.433e-27
0.0364	1.221e+09	3.956e-23	4.650e-23	2.248e-25	2.642e-25
0.6616	7.905e+10	6.496e+02	2.744e+03	1.259e+00	5.319e+00
0.6938	6.880e+04	6.308e-04	2.598e-03	1.218e-06	5.016e-06
1.1732	4.218e+08	1.245e+01	3.798e+01	2.225e-02	6.788e-02
1.3325	4.218e+08	1.631e+01	4.623e+01	2.830e-02	8.021e-02
Totals	8.720e+10	6.783e+02	2.828e+03	1.310e+00	5.467e+00

Results - Dose Point # 2 - (186,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm ² /sec No Buildup	Fluence Rate MeV/cm ² /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.177e-260	7.766e-27	1.492e-260	5.323e-27
0.0318	1.819e+09	5.737e-33	1.205e-25	4.779e-35	1.004e-27
0.0322	3.356e+09	1.125e-31	2.259e-25	9.053e-34	1.818e-27
0.0364	1.221e+09	3.207e-23	3.768e-23	1.822e-25	2.141e-25
0.6616	7.905e+10	5.172e+02	2.177e+03	1.003e+00	4.220e+00
0.6938	6.880e+04	5.021e-04	2.061e-03	9.695e-07	3.978e-06
1.1732	4.218e+08	9.880e+00	2.994e+01	1.766e-02	5.351e-02
1.3325	4.218e+08	1.293e+01	3.639e+01	2.243e-02	6.313e-02
Totals	8.720e+10	5.400e+02	2.243e+03	1.043e+00	4.337e+00

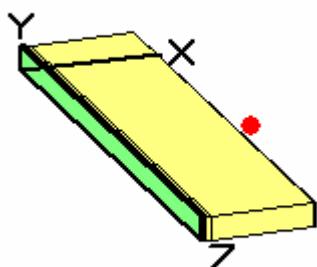
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File Ref :
Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	137.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

Buildup : The material reference is - Air Gap
Integration Parameters

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.638e-260	1.916e-26	1.808e-260	1.313e-26
0.0318	1.819e+09	7.020e-33	1.056e-23	5.847e-35	8.796e-26
0.0322	3.356e+09	1.377e-31	2.118e-23	1.109e-33	1.705e-25
0.0364	1.221e+09	3.956e-23	5.590e-21	2.248e-25	3.176e-23
0.6616	7.905e+10	6.496e+02	4.363e+03	1.259e+00	8.458e+00
0.6938	6.880e+04	6.308e-04	4.022e-03	1.218e-06	7.766e-06
1.1732	4.218e+08	1.245e+01	4.761e+01	2.225e-02	8.509e-02
1.3325	4.218e+08	1.631e+01	5.612e+01	2.830e-02	9.737e-02
Totals	8.720e+10	6.783e+02	4.467e+03	1.310e+00	8.641e+00

Results - Dose Point # 2 - (186,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.177e-260	1.432e-26	1.492e-260	9.815e-27
0.0318	1.819e+09	5.737e-33	7.892e-24	4.779e-35	6.574e-26
0.0322	3.356e+09	1.125e-31	1.583e-23	9.053e-34	1.274e-25
0.0364	1.221e+09	3.207e-23	4.530e-21	1.822e-25	2.574e-23
0.6616	7.905e+10	5.172e+02	3.455e+03	1.003e+00	6.699e+00
0.6938	6.880e+04	5.021e-04	3.184e-03	9.695e-07	6.148e-06
1.1732	4.218e+08	9.880e+00	3.749e+01	1.766e-02	6.699e-02
1.3325	4.218e+08	1.293e+01	4.411e+01	2.243e-02	7.653e-02
Totals	8.720e+10	5.400e+02	3.537e+03	1.043e+00	6.842e+00

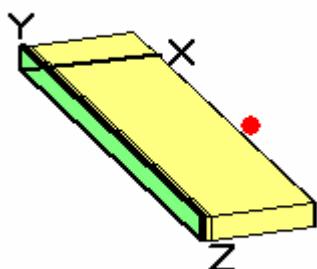
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Date :
By :
Checked :

Case Title: PM-2A V-14
Description: Dose at top of tank
Geometry: 13 - Rectangular Volume

Source Dimensions:

Length	10.16 cm	(4.0 in)
Width	1.7e+3 cm	(55 ft 0.0 in)
Height	82.245 cm	(2 ft 8.4 in)



Dose Points

A	X	Y	Z
# 1	382.27 cm 12 ft 6.5 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in
# 2	472.44 cm 15 ft 6.0 in	41.148 cm 1 ft 4.2 in	838.2 cm 27 ft 6.0 in

Shields

Shield N	Dimension	Material	Density
Source	8.55e+04 in ³	Concrete	1.2
Shield 1	8.0 in	Water	0.8
Shield 2	137.5 in	Air	0.00122
Shield 3	.5 in	Iron	7.86
Air Gap		Air	0.00122

Source Input : Grouping Method - Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	2.3745e+000	8.7855e+010	1.6951e+000	6.2717e+004
Co-60	1.1400e-002	4.2180e+008	8.1381e-003	3.0111e+002
Cs-137	2.5100e+000	9.2870e+010	1.7918e+000	6.6297e+004
Sr-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004
Y-90	2.1000e+000	7.7700e+010	1.4991e+000	5.5468e+004

**Buildup : The material reference is - Source
Integration Parameters**

X Direction	20
Y Direction	20
Z Direction	100

Results - Dose Point # 1 - (150.5,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.638e-260	1.142e-26	1.808e-260	7.828e-27
0.0318	1.819e+09	7.020e-33	3.185e-25	5.847e-35	2.653e-27
0.0322	3.356e+09	1.377e-31	6.108e-25	1.109e-33	4.915e-27
0.0364	1.221e+09	3.956e-23	1.246e-22	2.248e-25	7.081e-25
0.6616	7.905e+10	6.496e+02	3.535e+03	1.259e+00	6.853e+00
0.6938	6.880e+04	6.308e-04	3.297e-03	1.218e-06	6.366e-06
1.1732	4.218e+08	1.245e+01	4.288e+01	2.225e-02	7.663e-02
1.3325	4.218e+08	1.631e+01	5.128e+01	2.830e-02	8.897e-02
Totals	8.720e+10	6.783e+02	3.629e+03	1.310e+00	7.018e+00

Results - Dose Point # 2 - (186,16.2,330) in

Energy MeV	Activity Photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0045	9.120e+08	2.177e-260	8.535e-27	1.492e-260	5.850e-27
0.0318	1.819e+09	5.737e-33	2.381e-25	4.779e-35	1.983e-27
0.0322	3.356e+09	1.125e-31	4.564e-25	9.053e-34	3.673e-27
0.0364	1.221e+09	3.207e-23	1.010e-22	1.822e-25	5.739e-25
0.6616	7.905e+10	5.172e+02	2.802e+03	1.003e+00	5.432e+00
0.6938	6.880e+04	5.021e-04	2.613e-03	9.695e-07	5.044e-06
1.1732	4.218e+08	9.880e+00	3.378e+01	1.766e-02	6.037e-02
1.3325	4.218e+08	1.293e+01	4.034e+01	2.243e-02	6.998e-02
Totals	8.720e+10	5.400e+02	2.876e+03	1.043e+00	5.563e+00